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THE GREAT ALUMINUM FLEET: THE LCS, EPF, AND MARITIME DRUG INTERDICTION

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THE GREAT ALUMINUM FLEET: THE LCS, EPF, AND MARITIME DRUG INTERDICTION

by

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September 2021

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As the war on drugs enters the 50th year, illegal drug profits continue to support terrorism and human trafficking, discarded drug boats are leaking fuels into the seas, and drug traffickers are using evolving technology, including semi-submersibles, narco-torpedoes, and full submarines. By analyzing the threat, the technology, and U.S. counterdrug policy and strategy, this thesis offers the Navy four necessary capabilities for a counterdrug vessel. The Navy and U.S. Southern Command (SOUTHCOM) need speed and the ability to support Coast Guard law enforcement detachments (LEDET) and helicopter interdiction tactical squadrons (HITRON), as well as to deploy aircraft and rigid hull inflatable boats (RHIB). Weighing the littoral combat ship (LCS) and the expeditionary fast transport (EPF) class, the thesis finds that the LCS is suitable for the counterdrug mission, especially if implemented with critical safety fixes, but the EPF alone is unsuitable. The thesis recommends a creative solution: use the LCS and EPF together to support the fight against drug traffickers.

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THE GREAT ALUMINUM FLEET: THE LCS, EPF, AND MARITIME DRUG INTERDICTION

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Submitted in partial fulfillment of the
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ABSTRACT

As the war on drugs enters the 50th year, illegal drug profits continue to support terrorism and human trafficking, discarded drug boats are leaking fuels into the seas, and drug traffickers are using evolving technology, including semi-submersibles, narco-torpedoes, and full submarines. By analyzing the threat, the technology, and U.S. counterdrug policy and strategy, this thesis offers the Navy four necessary capabilities for a counterdrug vessel. The Navy and U.S. Southern Command (SOUTHCOM) need speed and the ability to support Coast Guard law enforcement detachments (LEDET) and helicopter interdiction tactical squadrons (HITRON), as well as to deploy aircraft and rigid hull inflatable boats (RHIB). Weighing the littoral combat ship (LCS) and the expeditionary fast transport (EPF) class, the thesis finds that the LCS is suitable for the counterdrug mission, especially if implemented with critical safety fixes, but the EPF alone is unsuitable. The thesis recommends a creative solution: use the LCS and EPF together to support the fight against drug traffickers.

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LIST OF ACRONYMS AND ABBREVIATIONS

AOR	Area of Responsibility
ASW	Anti-Submarine Warfare
AUF	Airborne Use of Force
C2	Command and Control
CBP	Customs and Border Patrol
CNO	Chief of Naval Operations
CODAG	Combination of Diesel and Gas
D&M	Detection and Monitoring
DDG	Destroyer
DEA	Drug Enforcement Administration
DHS	Department of Homeland Security
DOD	Department of Defense
DTO	Drug Trafficking Organization
EPF	Expeditionary Fast Transport
HITRON	Helicopter Interdiction Tactical Squadron
HSV	High-speed Vessel
ISR	Intelligence, Surveillance, and Reconnaissance
JCS	Joint Chiefs of Staff
JHSV	Joint High Speed Vessel
JIATF-S	Joint Interagency Task Force South
LCS	Littoral Combat Ship
LEDET	Law Enforcement Detachment
MCM	Mine Counter Measure
MIW	Mine Warfare
MOU	Memorandum of Understanding
MPA	Maritime Patrol Aircraft
MSC	Military Sea Lift Command
NAVSOUTH	U.S. Naval Forces Southern Command
NDCS	National Drug Control Strategy

OHP	Oliver Hazard Perry
PC	Patrol Craft
POE	Projected Operating Environment
RHIB	Rigid Hull Inflatable Boat
ROC	Required Operational Capabilities
SASC	Senate Armed Services Committee
SPS	Southern Partnership Station
SPSS	Self-propelled Semi-Submersible
SOUTHCOM	United States Southern Command
SSC	Small Surface Combatant
SUW	Surface Warfare
TSV	Theater Support Vessel
UAS	Unmanned Aerial System
UAV	Unmanned Aerial Vehicle
USCG	United States Coast Guard
USN	United States Navy
USNS	United States Naval Ship
VBSS	Visit, Board, Search, and Seizure

I. INTRODUCTION

A. MAJOR RESEARCH QUESTION

Drug trafficking is a lucrative enterprise, which has led to a rise in drug trafficking organizations (DTO) throughout Central and South America. DTO's *raîson d'être* severely impacts the United States' national security. Since President Nixon declared drugs enemy number one in 1971, the United States has increasingly fought the war on drugs, involving multiple agencies and international partners to defeat a common threat.[1] The threat is the drug trade—the combination of illegal drugs, drug producers, and drug traffickers.[2] Because the drug trade primarily originates from Central and South America then flows through the Caribbean and Pacific Ocean into the United States, and because DTOs continuously evolve the means by which they traffic their dangerous wares, the threat is both a U.S. national security issue and a maritime security priority.

The maritime region over which most drug trafficking occurs encompasses over six million square miles across a transit zone that comprises the waters in the Eastern Pacific, the Gulf of Mexico, and the Caribbean Sea.[3] Between 60 and 65 percent of the cocaine smuggled into the United States passes through the eastern portion of the Pacific and Central America passageway while the remaining 35 to 40 percent transits across the Caribbean island chain.[4] DTOs are extremely versatile in methods of transporting drugs across borders, whether through the sea, air, or land. However, trafficking drugs by sea is fast, cheap, offers multiple points of entry into the United States, and potentially eliminates

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[1] "A Brief History of the Drug War," Drug Policy Alliance, accessed August 10, 2021, https://drugpolicy.org/issues/brief-history-drug-war.

[2] Peter Chaveriat, "Counter-Narcoterrorism Operations in the Eastern Pacific and Caribbean Operations Areas from 1970 through 1990" (master's thesis, U.S. Army Command and General Staff College, 2010), 1, https://apps.dtic.mil/dtic/tr/fulltext/u2/a524429.pdf.

[3] James Hull and Michael Emerson, "High 'Seize' Maritime Interdiction Works!," United States *Naval Institute Proceedings*, January 1, 1999, 65, https://search-proquest-com.libproxy.nps.edu/docview/205995325/fulltext/48C9D557F0C64CC7PQ/1?accountid=12702.

[4] Peter Chalk, *Latin American Drug Trade: Scope, Dimensions, Impact, and Response,* (Santa Monica, CA: RAND, 2011), xi, https://www.rand.org/content/dam/rand/pubs/monographs/2011/RAND_MG1076.pdf.

the need for numerous middlemen, the use of which can decrease DTOs' profits and increase the risk of seizure.

Because DTOs prioritize the sea, the United States and its partners must maintain maritime domain awareness in the Western Hemisphere[5] and classify contacts of interest, a complex and difficult necessity that requires the appropriate supporting assets and the logistics for their deployment. To succeed in drug interdiction, the United States must be able to "detect, control, and engage drug smugglers out at sea."[6] Detection alone poses serious challenges: a drug interdiction vessel operating alone—with reliable intelligence that indicates the presence of a possible drug trafficking boat within its operating area—has only a roughly 4 to 5 percent chance of detecting the drug trafficking boat.[7] With an embarked helicopter, the detection rate increases to 30 percent.[8] Even if detected, interception is far from guaranteed.

Cuts to and problems with U.S. assets, resources, and budgets are severely impinging the effort. In the last five years, U.S. Southern Command (SOUTHCOM) has experienced deep budget cuts that have negatively affected its ability to support its missions and lines of effort. In a 2020 Senate Armed Serves Committee (SASC) hearing, SOUTHCOM Commander Admiral Craig S. Faller states, "USSOUTHCOM absorbed 25 percent cuts to our personnel, a 10 percent reduction to our exercise program, and a steady decline in available assets and forces."[9] The need for cost-effective resources has increased but is not new. During his tenure as SOUTHCOM commander General John F. Kelly

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[5] Hull and Emerson, "High 'Seize' Maritime Interdiction Works!" 64.

[6] Hull and Emerson, 65.

[7] John Stryker, "Narcosubmarines: Nexus of Terrorism and Drug Trafficking?," Center for International Maritime Security, January 11, 2018, http://cimsec.org/narcosubmarines-nexus-terrorism-drug-trafficking/35223.

[8] Stryker.

[9] *Posture Statement of Admiral Craig S. Faller Commander, United States Southern Command*, 116th Cong. (2020) (statement of Craig S. Faller, USSOUTHCOM Commander), January 30, 2020, https://www.southcom.mil/Portals/7/Documents/Posture%20Statements/SASC%20SOUTHCOM%20Posture%20Statement_FINAL.pdf.

stated, "I simply sit and watch [drug trafficking] go by."[10] A strategic way to help solve this problem is to find the right small surface combatant (SSC) asset for counterdrug operations, potentially allowing a larger naval presence in the SOUTHCOM area of responsibility (AOR).[11] To determine what SSC assets work best requires an understanding of which capabilities the assets need to successfully interdict DTOs.

This thesis, therefore, examines the following question regarding two existing SSC platforms. Are littoral combat ship (LCS) and expeditionary fast transport (EPF) platforms suited for the drug interdiction mission?

B. SIGNIFICANCE OF THE RESEARCH QUESTION

The United States has reached a critical turning point in counterdrug operations because the United States Navy (USN or Navy) platforms traditionally used for drug interdiction have reached the end of their operational life. Until 2015, the Navy primarily utilized the Oliver Hazard Perry (OHP) Frigate as the workhorse for drug interdiction throughout the SOUTHCOM AOR. However, the Navy decommissioned the last frigate in 2015, leaving a maritime asset gap that means the Navy has no surface asset solely dedicated to counterdrug operations.[12] The Navy has recently utilized the Arleigh Burke-class Destroyer (DDG) to fill the void,[13] but, in an era of great power competition, deploying DDGs on counterdrug missions may not be the most efficient use of a naval platform needed elsewhere, such as in the waters near Iran, Russia, and China.

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[10] Byron Ramirez and Robert J. Bunker, "Narco-Submarines: Specially Fabricated Vessels Used for Drug Smuggling Purposes," U.S. Army Foreign Military Studies Office, 2015, 7, https://scholarship.claremont.edu/cgi/viewcontent.cgi?article=1029&context=cgu_facbooks.

[11] Sam LaGrone, "Low Cost Ship Options for U.S. Navy's Drug War," *USNI News*, March 20, 2013, https://news.usni.org/2013/03/20/low-cost-ship-options-for-u-s-navys-drug-war.

[12] Sam LaGrone, "Navy Won't Reactivate Perry Frigates for SOUTHCOM Mission; Will Send Ships to Fight Drug War in 2018," *USNI* News, December 11, 2017, https://news.usni.org/2017/12/11/secnav-memo-navy-wont-reactivate-perry-frigates-southcom-mission-will-send-ships-fight-drug-war-2018.

[13] Sam LaGrone, "Destroyers Continue to Prowl 4th Fleet As Coast Guard, Navy Rack Up $1B in Drug Seizures," *USNI News*, July 2, 2020, https://news.usni.org/2020/07/02/destroyers-continue-to-prowl-4th-fleet-as-coast-guard-navy-rack-up-1b-in-drug-seizures.

The core challenge has been finding a multi-purpose platform suitable for maritime drug interdiction. The United States has tested the use of an LCS for counterdrug efforts,[14] and, in 2017, the Navy also auditioned the EPF class to supplement the LCS.[15] Although both classes of ships have demonstrated success in the open ocean to detect, monitor, and interdict drug boats and submarines, Congress and other stakeholders have concerns over their design, procurement, and survivability.[16] For example, EPFs have suffered bow damage in the high seas due to a design flaw, leaving them susceptible to wave slams.[17] As a cost measure, Congress has limited the Navy's LCS production, and initially reduced the inventory from 52 to 40,[18] and then again to 35.[19] Additionally, neither ship is expected to be survivable in combat and so would fail to meet multi-purpose criteria; the EPF was designed as a cargo ship with little armor or armament[20] while a 2011 operational test determined that the "LCS is not expected to be survivable in a hostile combat environment."[21]

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14 "LCS In Action Against An Armed Enemy," U.S. Navy, accessed November 8, 2020, https://www.public.navy.mil/surfor/lcs1/Pages/LCSInActionAgainstAnArmedEnemy.aspx.

15 Brittney Cannady, "USNS Spearhead Conducts Narcotics Detection, Monitoring as Part of SPS 17," *Military News*, August 18, 2017, https://www.militarynews.com/norfolk-navy-flagship/news/top_stories/usns-spearhead-conducts-narcotics-detection-monitoring-as-part-of-sps-17/article_c548d0ce-0bd8-5d2f-83d0-21b759313641.html.

16 Ronald O'Rourke, *Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress*, CRS Report No. RL33741 (Washington, DC: Congressional Research Service, 2019), 3 https://fas.org/sgp/crs/weapons/RL33741.pdf.

17 Rich Miller, "Bows of Navy's Fast Transports Easily Damaged, Need Reinforcement," *Professional Mariner*, April 29, 2016, https://www.professionalmariner.com/bows-of-navys-fast-transports-easily-damaged-need-reinforcement/.

18 Christopher Cavas, "Pentagon Cuts LCS to 40 Ships, 1 Shipbuilder," *Defense News*, December 6, 2015, https://www.defensenews.com/naval/2015/12/17/pentagon-cuts-lcs-to-40-ships-1-shipbuilder/.

19 Richard Sisk, "New Law Restricts the Navy to 35 Littoral Combat Ships," *Military News*, December 23, 2019, https://www.military.com/daily-news/2019/12/23/new-law-restricts-navy-35-littoral-combat-ships.html.

20 Grace Jean, "Aluminum 'Truck' Joint High Speed Vessel: Great Potential, But Questions Remain," *National Defense* 95, no. 688 (March 2011): 34–36, https://search-proquest-com.libproxy.nps.edu/docview/858093550/fulltext/45964D216B354A79PQ/1?accountid=12702.

21 Sebastien Roblin, "Here Is Why the U.S. Navy's Littoral Combat Ships Punch below Their Weight," *The National Interest*, https://nationalinterest.org/blog/the-buzz/here-why-the-us-navys-littoral-combat-ships-punch-below-23042.

C. LITERATURE REVIEW

The thesis provides a two-section literature review. The first section reviews the scope of drug trafficking. The second section reviews debates regarding the SSC ship types the Navy has so far utilized in the drug-interdiction mission in the SOUTHCOM AOR.

1. The Drug Trafficking Problem

The 2020 *National Drug Control Strategy* (NDCS) articulates the importance of defeating the drug trafficking threat since "almost all of the illicit drugs causing American deaths are produced outside the United States and trafficked across the Nation's borders and through the international mail and express consignment carriers."[22] Thus, American citizens are exposed to heroin, cocaine, and other illegal drugs that destroy thousands of lives every year.[23] According to researchers from the University of Pennsylvania, "Since 1971, America has spent over a trillion dollars enforcing its drug policy. Yet many observers, both liberal and conservative, say the war on drugs has not paid off."[24] According to the National Institute on Drug Abuse, over $600 billion is spent annually strictly on substance abuse costs with a possibility of increasing.[25] Statistics from the Drug Policy Alliance highlight that from 1999 to 2019, the number of reported overdose deaths increased exponentially from 16,849 to 71,130.[26]

Furthermore, drug trafficking provides both international and domestic DTOs a way of supporting corruption, destabilizing U.S. partner nations, and also funding an

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[22] Office of National Drug Control Policy, *National Drug Control Strategy* (Washington, DC: White House, 2020), 17, https://legislativeanalysis.org/wp-content/uploads/2020/02/2020-ONDCP-National-Drug-Control-Strategy.pdf.

[23] Office of National Drug Control Policy, 17–18.

[24] Nathaniel Lee, "America Has Spent over a Trillion Dollars Fighting the War on Drugs. 50 Years Later, Drug Use in the U.S. Is Climbing Again," *CNBC*, June 17, 2021, https://www.cnbc.com/2021/06/17/the-us-has-spent-over-a-trillion-dollars-fighting-war-on-drugs.html.

[25] "Is Drug Addiction Treatment Worth Its Cost?," National Institute on Drug Abuse, accessed August 10, 2021, https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/frequently-asked-questions/drug-addiction-treatment-worth-its-cost.

[26] "Drug War Statistics," Drug Policy Alliance, accessed August 10, 2021, https://drugpolicy.org/issues/drug-war-statistics.

assortment of other illicit undertakings.[27] The United Nations states that "Drug trafficking accounts for half of all transnational organized crime proceeds providing a constant source of funding for other criminal activities and even threats such as terrorism."[28]

Research indicates that the opportunities for trafficking illicit drugs into the United States are vast and challenging to manage, particularly regarding heroin and cocaine, and the geography alone gives a sense of why. Figure 1 depicts the various drug trafficking routes for the movement of cocaine from Central and South America into the United States.

Figure 1. Movement of Cocaine into the United States[29]

[27] Office of National Drug Control Policy, *National Drug Control Strategy*, 18.

[28] Interpol, "On Global Anti-Drug Trafficking Day INTERPOL and WCO Highlight the Pandemic's Multiplying Effect on Illicit Activities," June 26, 2020, https://www.interpol.int/en/News-and-Events/News/2020/On-global-anti-drug-trafficking-day-INTERPOL-and-WCO-highlight-the-pandemic-s-multiplying-effect-on-illicit-activities.

[29] Source: Clare Seelke et al., *Latin America and the Caribbean: Illicit Drug Trafficking and U.S. Counterdrug Programs*, CRS Report No. R41215 (Washington, DC: Congressional Research Service, 2011), 3, https://fas.org/sgp/crs/row/R41215.pdf.

Donald Mabry gives numerical data on methods of transit into the United States that helps puts this management problem into perspective. Annually, over 250 million people transit across the U.S. borders, over 25 million air passengers arrive across 500,000 airline flights, 8 million cargo containers enter U.S. ports, and over 100 million parcels transit across the country.[30] Filtering this amount of traffic every year to separate the innocent from the malicious is an enormous task.

The supply of illicit drugs entering the United States from the Western Hemisphere primarily originates from Colombia and Mexico. According to the 2019 National Drug Threat Assessment, the Drug Enforcement Administration (DEA) reports that "almost 90 percent of cocaine seized and tested in the United States originated from Colombia."[31] In addition, the threat assessment lists Mexico as a significant producer of marijuana, with over 300,000 kilograms seized by the California Border Patrol in 2018.[32] The United Nations Office on Drugs and Crime notes that cocaine and heroin is smuggled from South America to Mexico by sea, shipped through complex land routes, and ultimately reaches North American markets.[33] On-site drug eradication is failing, allowing cultivation to increase, and the air-bridge denial program in Colombia has seen only minimal success, making maritime interdiction that much more crucial.[34]

Sam Lagrone notes that cartels have increased their transportation of illegal drugs into the United States over the last decade: cartels have been trafficking large "amounts of cocaine by the sea, using complex, multi-million-dollar, custom drug boats, which are very

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30 Donald Mabry, "The US Military and the War on Drugs in Latin America," *Journal of Interamerican Studies and World Affairs* 30, no. 2–3 (1988): 54–55, https://doi.org/10.2307/165979.

31 U.S. Department of Justice, *2019 Drug Enforcement Administration: National Drug Threat Assessment* (Washington, DC: U.S. Department of Justice, 2019), 60, https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020_Low_Web-DIR-007-20_2019.pdf.

32 U.S. Department of Justice, 77.

33 United Nations, "Drug Trafficking," United Nations: Office on Drugs and Crime, accessed November 17, 2020, https://www.unodc.org/unodc/en/drug-trafficking/index.html.

34 Adam Isacson, "Restarting Aerial Fumigation of Colombia Drug Crops Is a Mistake," WOLA, last modified March 7, 2019, https://www.wola.org/analysis/restarting-aerial-fumigation-of-drug-crops-in-colombia-is-a-mistake/.

difficult to detect."[35] Submarine expert H.I. Sutton clarifies the reality: "These days, narco-subs typically carry about 1.5 tons of cocaine split into 1 kg bricks and then bundled together into bales...much of their hull is actually taken up with fuel to give them an incredible range of more than 2,000 miles."[36] The increase in range means not only trouble for the United States but also for Europe. The International Criminal Police Organization and the World Customs Organization see the increased drug flow coming into Europe as a critical concern affecting the region.[37] In a briefing paper, Mikael Wigell and Mauricio Romero state, "As the market for cocaine has been contracting in North America, Central and South American drug networks have switched their attention to Europe, which is now the world's fastest-growing market for cocaine."[38] For the European market, drug traffickers smuggle cocaine by sea, either through narco submarines[39] or through merchant vessel cargo.[40]

In five decades of fighting the war on drugs, DTOs have proven seriously, cunningly adaptable. The NDCS states that "Law enforcement agencies across all levels have achieved considerable success in combating drug trafficking and use, yet traffickers continue to refine their methods and adopt new techniques for delivering potent illicit drugs to our communities."[41]

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[35] LaGrone, "Destroyers Continue to Prowl 4th."

[36] H. I. Sutton, "Why The Navy's Latest Narco Submarine Seizure Is A Big Deal," *Forbes*, June 12, 2020, https://www.forbes.com/sites/hisutton/2020/06/12/why-the-navys-latest-narco-submarine-seizure-is-important/.

[37] Interpol, "Drug Trafficking and Terrorism Focus of INTERPOL European Regional Conference," May 29, 2019, https://www.interpol.int/en/News-and-Events/News/2019/Drug-trafficking-and-terrorism-focus-of-INTERPOL-European-Regional-Conference.

[38] Mikael Wigell and Mauricio Romero, "Transatlantic Drug Trade: Europe, Latin America and the Need to Strengthen Anti-Narcotics Cooperation," *The Finnish Institute of International Affairs*, June 2013, 2, https://eulacfoundation.org/en/system/files/Transatlantic%20Drug%20Trade.pdf.

[39] H. I. Sutton, "Completely New Type Of Narco Submarine Discovered In The Atlantic," *Forbes*, August 31, 2020, https://www.forbes.com/sites/hisutton/2020/08/31/completely-new-type-of-narco-submarine-discovered-in-the-atlantic/.

[40] Costas Paris, "Global Shipping Faces Troubling New Smuggling Questions," *Wall Street Journal*, January 6, 2020, https://www.wsj.com/articles/global-shipping-faces-troubling-new-smuggling-questions-11578330634.

[41] Office of National Drug Control Policy, *National Drug Control Strategy*, 17–18.

2. SSC Drug Interdiction Vessels in SOUTHCOM

The *Cooperative Strategy for 21st Century Seapower* outlines the importance of sea services and how the Navy can utilize ships in supporting national, defense, and security strategies.[42] The strategy dictates that sea services, including the Navy and the United States Coast Guard (USCG or Coast Guard), interdict and board vessels trafficking illegal materials and personnel.[43] According to the strategy, Navy SSC such as the LCS, EPF, and Patrol Craft (PC) are to accomplish the goal of protecting U.S. interests in dealing with the drug interdiction problem. This second literature review section reviews the specifics and the debates over using the LCS, PC, and EPF as drug interdiction vessels.

a. Littoral Combat Ship

The Navy commissioned the LCS to replace the OHP frigates, and it was supposed to be a multi-mission ship with the capability to "plug-and-fight" various mission modules around mine warfare (MIW), surface warfare (SUW), and anti-submarine warfare (ASW) including unmanned vehicles.[44] In his 2003 Naval Postgraduate School master's thesis, David Rudko regards the LCS as "an affordable, small, multi-mission ship capable of independent, interdependent and integrated operations inside the littorals."[45] The LCS program did not, however, go exactly according to plan. According to Congressional Research Service reports, production problems and concerns about the hulls involving corrosion have severely degraded the LCS program.[46] Two LCS variants, the Independence and the Freedom, have experienced serious engineering problems, causing millions in repair costs to bring these ships back to service. In 2015, the USS *Milwaukee* (LCS-5) experienced a glancing blow to its port and starboard combining gear that caused

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[42] Department of Defense, *U.S. Cooperative Strategy for 21st Century Seapower 2015 Revision* (Washington, DC: Department of Defense, 2015), https://news.usni.org/2015/03/13/document-u-s-cooperative-strategy-for-21st-century-seapower-2015-revision.

[43] Department of Defense, 26.

[44] O'Rourke, *Navy Littoral Combat Ship (LCS) Program*, 2

[45] David D. Rudko, "Logistical Analysis of the Littoral Combat Ship" (master's thesis, Naval Postgraduate School, 2003), xv, https://calhoun.nps.edu/bitstream/handle/10945/1069/03Mar_Rudko.pdf?sequence=1&isAllowed=y.

[46] O'Rourke, *Navy Littoral Combat Ship (LCS) Program*, 2.

its high-speed clutches to fail to disengage in time, resulting in it having to be towed back to port.[47] Then, in 2016, the LCS program experienced its worst year, with four problems revolving around hull cracks and engineering failures.[48] In addition, the Navy has decided to decommission the first four ships in the class to save money for modernizing these hulls due to shipbuilding and upgrade costs.[49]

However, even with such program setbacks, Navy leaders have praised the LCS platforms for successfully executing drug interdiction missions. In his 2019 posture statement, Admiral Faller asserts that the LCS is mission fit throughout the SOUTHCOM region.[50] He also notes that utilizing the LCS in the SOUTHCOM AOR delivers an ability and technological advantage against DTOs in the open ocean and that the LCS platform is well-suited to intercept drug boats and narco-submarines due to its speed, maneuverability, and ability to support aviation efforts.[51] Senior military officers such as Chief of Naval Operations (CNO) Admiral Michael Gilday also view the LCS as a perfect candidate for the drug interdiction mission: "I can deploy these things with a law enforcement detachment (LEDET), and a signals intelligence capability, and I can do that on LCS with carry-on gear," Gilday opines. "It's the right kind of platform for that...I'd prefer to do them with an LCS instead of a DDG if I can."[52] Gilday also adds that LCS platforms could be sent out in mass numbers in the 4th Fleet without the need for a DDG.[53] Faller and other

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[47] Sam LaGrone, "Littoral Combat Ship USS Milwaukee Repairs Could Last Weeks," *USNI News*, December 15, 2015, https://news.usni.org/2015/12/14/littoral-combat-ship-uss-milwaukee-repairs-could-last-weeks.

[48] Hope Seck, "New Details Emerge on Littoral Combat Ship Breakdowns," *Military News*, December 9, 2016, https://www.military.com/daily-news/2016/12/09/new-details-emerge-on-littoral-combat-ship-breakdowns.html.

[49] Michael Gilday, "Fiscal Year 2021 Projected Ship Inactivation Schedule," United States Navy, June 20, 2021, https://www.navy.mil/Resources/NAVADMINs/Message/Article/2277297/fiscal-year-2021-projected-ship-inactivation-schedule/.

[50] *2019 Posture Statement to Congress*, 116th Cong. (2019) (statement of Craig S. Faller, USSOUTHCOM Commander), May 1, 2019, https://www.southcom.mil/Media/Special-Coverage/SOUTHCOMs-2019-Posture-Statement-to-Congress/.

[51] Faller, testimony on 2019 Posture Statement.

[52] David Larter, "US Navy Prepares Major Surge of Littoral Combat Ship Deployments," *Defense News*, July 31, 2020, https://www.defensenews.com/naval/2020/07/31/the-us-navy-is-preparing-a-major-surge-of-lcs-deployments/.

[53] Larter.

officials have publicized the capabilities of the LCS—which include attaining speeds over 40 knots, being able to launch and recover helicopters, and deploying drones—as a perfect vessel of opportunity for the counterdrug mission in the SOUTHCOM AOR.[54]

On the other hand, other senior officers such as Vice Admiral Roy Kitchener and Rear Admiral Casey Moton note that wear and tear could degrade both ships' reliability and maintainability.[55] Kitchener argues that, although the LCS platforms have been successful in supporting fleet commanders, their reliability needs improvement:

> Number one, we still continue to have some design problems on some of the engineering components on those ships. I think on the maintenance side there's some more work to be done. We've now successfully had deployments out to 7th Fleet, we've had successful deployments to 4th Fleet. And we got some good lessons learned, and we need to kind of figure out, okay, what is our global maintenance [concept of operations]? We need to figure out how are we going to repair these things [moving] forward.[56]

In addition to maintenance concerns, retired submarine officer and senior fellow at the Hudson Institute Bryan Clark notes the wear and tear the LCS platforms endure, especially because of the class's problematic propulsion architecture.[57] Additionally, Clark adds that sending LCS platforms overseas requires extensive maintenance once an LCS arrives in port, cutting down on deployment times. Ultimately, Clark believes that the efforts required to keep the LCS deployable outweigh its mission benefits.[58]

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[54] Seth Robbins, "Why Is U.S. Sending Navy Warships to Thwart Drug Smugglers?," *InSight Crime*, April 27, 2020, https://www.insightcrime.org/news/analysis/us-navy-warships-drug-smugglers/.

[55] Megan Eckstein and Mallory Shelbourne, "Naval Surface Forces Kicks Off Follow-On LCS Study To Refine Maintenance, Reliability Issues," *USNI News*, October 5, 2020, https://news.usni.org/2020/10/05/naval-surface-forces-kicks-off-follow-on-lcs-study-to-refine-maintenance-reliability-issues.

[56] Eckstein and Shelbourne.

[57] Larter, "US Navy Prepares Major Surge of Littoral Combat Ship Deployments."

[58] Larter.

b. Cyclone-Class Patrol Ship

With the decommissioning of the last OHP Frigate in 2015,[59] the Cyclone-class Patrol Ships (PC) have been the only Navy surface units consistently executing the counterdrug mission throughout the Caribbean.[60] Of the thirteen active Navy PCs in the fleet, USS *Zephyr* (PC 8), USS *Shamal* (PC 13), and USS *Tornado* (PC 14) are based out of Mayport, Florida, while the remaining ten are homeported in Manama, Bahrain. With a crew of 30 and a length of 179 feet,[61] the PCs were designed for coastal patrol, interdiction, and surveillance. As Gilbert and Uhls argue, the PCs have demonstrated their value in the war on drugs to theater commanders,[62] especially in the eastern Pacific Ocean and Caribbean.[63] The deployments for PCs from Mayport primarily in support of SOUTHCOM and the drug interdiction mission serve as an excellent model. Gilbert notes that drug smugglers operate in very shallow areas that most naval ships cannot access.[64] To counter this, PC capabilities, such as speed, maneuverability, and size play a critical role.

Although the PCs have demonstrated success in the counterdrug mission, the president's 2021 budget notes the decommissioning of the three PCs in Mayport, leaving only the remaining ten forward deployed to Bahrain, therefore reducing the available assets to SOUTHCOM.[65] For this reason, the thesis does not consider PCs in its analysis.

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59 Sam LaGrone, "Last Oliver Hazard Perry Frigate USS Simpson Leaves Service, Marked for Foreign Sale," *USNI News*, September 29, 2015, https://news.usni.org/2015/09/29/last-oliver-hazard-perry-frigate-uss-simpson-leaves-service-marked-for-foreign-sale.

60 Cameron Ingram and Matthew Arndt, "Patrol Craft Employment In The Caribbean," *Surface Warfare Magazine*, November 12, 2020, https://www.public.navy.mil/surfor/swmag/Pages/Patrol-craft-employment-in-the-Caribbean.aspx.

61 Department of the Navy, "Patrol Coastal Ships - PC," America's Navy, January 9, 2017, https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2171625/patrol-coastal-ships-pc/.

62 C.J. Gilbert, "Maritime SOF: Patrol Coastal Ships A Vital Asset to the Theater CINC" (master's thesis, Marine Corps War College, 1999), 1, https://apps.dtic.mil/dtic/tr/fulltext/u2/a529635.pdf.

63 Daniel Uhls, "Does the Fast Patrol Boat Have a Future in the Navy?" (master's thesis, U.S. Army Command and General Staff College, 2002), https://apps.dtic.mil/dtic/tr/fulltext/u2/a415966.pdf.

64 Gilbert, "Maritime SOF," 20.

65 Gilday, "Fiscal Year 2021 Projected Ship Inactivation Schedule."

c. Expeditionary Fast Transport Ship

The EPF is a vessel that can be reconfigured to tackle multiple missions. The EPF's speed, size, and reconfigurable design allows theater commanders adaptability in using these unique ships. Former 4th Fleet Commanders Rear Admiral Sean Buck and Rear Admiral Sinclair Harris view the EPF as a perfect fit for 4th Fleet and SOUTHCOM[66] as it provides additional intelligence, surveillance, and reconnaissance (ISR) support while its speed can quickly transport the warfighter to the fight.[67] Steven Stacy agrees that an EPF in the SOUTHCOM AOR offers Joint Interagency Task Force South (JIATF-S) an additional sensor for detecting and monitoring suspicious vessels.[68]

The EPF offers several advantages over other vessels such as the DDG. Congressman Bradley Byrne—who represents Mobile, Alabama, where these ships are made—argues, "This vessel is truly a Swiss army knife that is able to support a wide range of missions for all the services."[69] Byrne believes that the EPF fills a vital asset gap for Combatant Commanders, the Navy, and the Marine Corps.[70] The Navy notes that EPF vessels have deployed to U.S.Indo-Pacific Command and U.S. Central Command AORs to deliver additional support for the respective Fleet Commanders.[71] Captain Todd Kutkiewicz, master of the USNS *Burlington* (EPF 10), views the vessel as providing additional support to the fleet, especially when paired with an LCS.[72] However, the critical advantage, in the view of senior defense advisor at the Shipbuilders Council of America Joe Carnevale, is that the EPF frees up other warships to conduct other missions.[73]

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66 LaGrone, "Low Cost Ship Options for U.S. Navy's Drug War."

67 Edward Lundquist, Interview With Rear Adm. Sean Buck, Commander U.S. Fourth Fleet, interview by Edward Lundquist, May 7, 2018, https://www.defensemedianetwork.com/stories/interview-with-rear-adm-sean-buck-commander-u-s-fourth-fleet/.

68 Cannady, "USNS Spearhead Conducts Narcotics Detection."

69 "Byrne Advocates for Alabama Shipbuilders During Committee Hearing," March 15, 2016, Bradley Byrne, video, 10:18, https://www.youtube.com/watch?v=qnJ8W8oTMaU.

70 Byrne.

71 Byrne.

72 LaShawn Sykes, "USNS Burlington Carries out Proof-of-Concept Testing," *DVIDS*, September 27, 2020, https://www.dvidshub.net/news/378778/usns-burlington-carries-out-proof-concept-testing.

73 Jean, "Aluminum 'Truck' Joint High Speed Vessel," 35.

Furthermore, Jan van Tol, a senior fellow at the Center for Strategic and Budgetary Assessments, adds that the EPF's shallow draft of 12.5 feet allows it to access coastal waters denied to a 30-foot draft DDG.[74] However, van Tol also notes that the EPF is unsuited to non-permissive environments and is, therefore, primarily valuable as a logistics platform.[75]

D. POTENTIAL EXPLANATIONS AND HYPOTHESES

Maritime security plays a critical role in securing our shorelines and ports against DTOs. This role requires a vast number of vessels to work within the boundaries of coastal waters. The Navy needs cost-effective, safe vessels to deploy for counterdrug operations. This thesis tests two hypotheses as to how the Navy can best deploy its small surface platforms for maritime security and drug interdiction:

- H1: Utilize both the LCS and EPF for counterdrug operations.
- H2: Utilize an LCS as the lead ship for counterdrug operations while utilizing an EPF as a detection and monitoring (D&M) platform.

E. RESEARCH DESIGN

The thesis analyzes the hypotheses by comparing the advantages and disadvantages of the LCS and EPF in a counterdrug maritime interdiction role. The thesis reviews U.S. strategy and policy publications as well as SASC reports, research reports, and newspaper and journal articles to establish four fundamental capabilities needed for counterdrug operations. The thesis reviews the ships' real-world specifications and applications to determine their suitability in the counterdrug mission, a critical component of our national security as well as that of our partner nations.

[74] Jean, 35.

[75] Jean, 35.

F. THESIS OVERVIEW AND CHAPTER OUTLINE

Following this first introductory chapter, the thesis accomplishes its mission in four subsequent chapters. Chapter II first reviews policy and strategy as regards to the vital importance of a maritime force and the security threats posed by DTOs. The chapter uses this research to develop four capabilities necessary to a successful counterdrug platform: the ability to support Coast Guard LEDET/Helicopter Interdiction Tactical Squadron (HITRON) personnel, speed, the ability to employ air assets, and the ability to employ rigid hull inflatable boats (RHIB). Chapter III then weighs the capabilities of the LCS class against that criteria while Chapter IV does the same for the EPF class, each starting with the ship's respective history. Finally, Chapter V provides the overall analytical findings, as well as recommendations for policymakers' consideration and for further research.

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II. MARITIME DRUG INTERDICTION: THREATS, POLICY, AND CAPABILITIES

This chapter examines the drug trafficking threat itself and U.S. policy and strategy regarding maritime drug interdictions against open ocean drug trafficking to develop a set of capabilities needed in a drug interdiction ship, with which to later analyze the counterdrug capabilities of the LCS and EPF ship classes. As a means of understanding the threat and thereby the capabilities necessary to counter it, as well as our counterdrug goals, the chapter first examines the vessels that drug trafficking organizations (DTO) use, and then reviews policy and strategy; with this understanding, the last section summarizes the capabilities necessary to meet our mission.

A. DRUG TRAFFICKING THREATS AT SEA

DTOs utilize various transportation modes to smuggle narcotics across the maritime border including fishing vessels and go-fast boats that have multiple outboard engines and more innovative means like semi-submersibles.[76] A 2020 Department of Homeland Security operations report also lists commercial vessels such as container ships.[77] The following sections examine the main maritime drug trafficking vessels.

1. Fishing Vessels

Most illegal narcotics from Central and South America arrive in Mexico in single shipments via fishing trawlers. Fishing vessels, commonly known as fishing boats or fishing trawlers, offer advantages for drug smuggling including navigation and communication technology.[78] Additionally, these vessels project the image of a routinely

[76] Department of Homeland Security, *Counter Drug Operations* (Washington, DC: Department of Homeland Security, 2020), 2, https://www.dhs.gov/sites/default/files/publications/uscg_-_counter-drug_operations.pdf.

[77] Department of Homeland Security, 2.

[78] Chalk, *Latin American Drug Trade,* 33.

operating fishing boat. They may carry both legitimate cargo and drug shipments, the latter within the vessel's hull or in false compartments.[79]

While fishing vessels are still frequently used for drug deliveries, successful interdiction methods have caused DTOs to shift away from transporting large narcotic shipments through direct routes. Vessels carrying large amounts of illegal drugs need speed to get away if detected by law enforcement or the military, and fishing vessels are often limited in speed. On average, depending on the make/model, most fishing vessels can only reach speeds of 7 to 10 knots. Of course, if DTOs think they are about to be caught, smugglers may toss illegal cargo over the side in an attempt to look like a legal fisher conducting routine business, which may evade capture but decreases profits.

2. Go-fast Boats

The go-fast boat presents a quicker way for transporting drugs across the open ocean, especially for single loads.[80] Crafted from wood and protected by fiberglass, these vessels are relatively cheap to make, ride low in the water, and have up to four outboard motors giving them speeds reaching 35 knots (40 miles per hour).[81] Figure 2 is an image of a beached go-fast boat outfitted with four outboard motors.

[79] Chalk, 33.

[80] Dave Minsky, "Drug Smugglers Love This Janky Boat," *VICE*, June 29, 2017, https://www.vice.com/en/article/43dypd/drug-smugglers-love-this-janky-boat.

[81] Minsky.

Figure 2. Go-fast Boat[82]

To keep up with go-fast boats, interdiction operations often require the assistance of an aviation asset.

Go-fast boats account for more than half of all drugs flowing through the maritime realm originating from Colombia and will likely continue to be a favored method of exporting cocaine.[83] However, Miguel Montoya, a former drug trafficker for the Medellin Cartel, says, "Go-fast boats become problematic. Roughly 50 percent would sink in transit to their destination; it was like flipping a coin. So, the Colombian organizations figured there had to be a safer way to transport drugs. That's how the idea of the semi-submersible was born."[84] Apparently, if drug cartels could not trick maritime enforcement authorities with fishing vessels or outrun them with speed, the next option was to go under them.

3. Semi-submersibles

In the last two decades, some DTOs in South America have invested in semi-submersible technologies to gain both a strategic and a technological advantage in the ocean. Semi-submersibles transit just below the waterline, outfitted with an exhaust, air

[82] Source: Nathan Jones, "Pangas, Trickery, Intimidation, and Drug Trafficking in California," *Small Wars Journal*, December 15, 2016, https://smallwarsjournal.com/jrnl/art/pangas-trickery-intimidation-and-drug-trafficking-in-california.

[83] Chalk, *Latin American Drug Trade*, 35.

[84] "Colombian Narcosubs," October 26, 2011, VICE, video, 27:41, https://www.youtube.com/watch?v=2Rp-C1ph_g8.

stack, and a pilothouse above the water line for navigation.[85] Additionally, the manning of these vessels requires not only a skilled captain, but also an experienced navigator to guide the vessel, an engineer to fix any engine problems, and a security guard to monitor the cargo.[86]

Most DTOs secretly build their semi-submersibles among the mangroves and jungles of Columbia's Pacific coast. According to Byron Ramirez, "the number of semi-submersibles has risen, as there are reports of seized semi-submersibles in Venezuela, Guyana, Ecuador, and Brazil."[87] Semi-submersible submarine production has risen for two main reasons.[88] First, coca plant cultivation throughout Colombia is at an all-time high. Second, drug smugglers recognize the open ocean as one of the most potent means of exporting narcotics across maritime borders and thus continue to expand their ranges and their means of smuggling their products to far-ranging markets.[89]

It is a challenge to determine how many drug boats are in use on particular routes. The DEA estimates semi-submersibles as accounting for approximately 25 percent of the maritime drug flow.[90] These new technologies increase the difficulty of estimating the number of these boats that operate undetected and arrive at their destination.[91] Also, for DTOs, seized boats are simply a cost of doing business. While it might cost $1 to $2 million USD to produce a semi-submersible, and the crew will likely scuttle the vessel at its

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[85] Tess Owen, "US Agents Watch as 'Narco Sub' Carrying $194 Million Worth of Cocaine Sinks After Bust," *VICE*, March 26, 2016, https://www.vice.com/en/article/43m7kd/us-agents-watch-as-narco-sub-carrying-194-million-worth-of-cocaine-sinks-after-bust.

[86] Owen.

[87] Byron Ramirez, "The Criminal and Terrorist Threat of Narco Submarine Technology," *Geopolitical Monitor*, June 7, 2016, https://www.geopoliticalmonitor.com/the-criminal-and-terrorist-threat-of-narco-submarine-technology/.

[88] Stephen Thorne, "Capture of 22-Metre Transatlantic Narco-Sub Marks New Era in War on Drugs," *Legion Magazine*, December 11, 2019, https://legionmagazine.com/en/2019/12/capture-of-22-metre-transatlantic-narco-sub-marks-new-era-in-war-on-drugs/.

[89] Thorne.

[90] Ramirez and Bunker, "Narco-Submarines," 7.

[91] Ramirez, "The Criminal and Terrorist Threat of Narco Submarine Technology."

destination, a semi-submersible submarine may carry around $40 million worth of cocaine in a single successful sprint.[92]

Detecting semi-submersibles from the water is problematic, but they are easily spotted from the air. As it can detect a military submarine traveling at periscope depth, an aircraft positioned in the right area can locate the semi-submersible's periscope wake, which is not visible from a maritime enforcement vessel.[93] However, semi-submersibles are outfitted with a valve that will quickly scuttle the submarine in case of detection. Then, the smugglers often jump overboard as the submarine sinks, prompting the interdiction team to conduct a search and rescue operation[94] to save lives as the submarine—along with its incriminating shipment—sinks. With no evidence to charge the smugglers, maritime law enforcement end up releasing the crew to their country of origin. To address this problem, the U.S. government passed the Drug Trafficking Vessel Interdiction Act of 2008, making it a criminal offense to have an unregistered semi-submersible in international waters, regardless of the nature of its cargo.[95]

DTOs persist in using semi-submersibles, and they also use complexity and creativity to move their product such as using "narco torpedoes." Captain George Rincon of the Colombian Navy explains that, to create a narco torpedo, a torpedo-shaped container is hollowed out and filled with tons of cocaine and then attached and towed behind a surface vessel.[96] As the host vessel increases speed, the torpedo submerges and remain submerged as long as the towing vessel continues moving.[97] It is impossible to see these torpedoes from the sky, which results in a high success rate. Figure 3 shows a narco torpedo.

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92 Ramirez and Bunker, "Narco-Submarines," 17.

93 Jason Furlong, "Hunting Submarines From The Air," *Physics World*, June 13, 2018, https://physicsworld.com/a/hunting-submarines-from-the-air/.

94 Chalk, *Latin American Drug Trade*, 37.

95 Drug Trafficking Vessel Interdiction Act of 2008, 46 and 18 U.S.C § 3598 (2008). https://www.justice.gov/archive/olp/pdf/s3598-enrolled-bill.pdf

96 Mimi Yagoub, "Why Colombia Traffickers Love High-Tech 'Narco Torpedoes," *InSight Crime*, 25 2016, https://www.insightcrime.org/news/analysis/why-colombia-cocaine-traffickers-love-high-tech-torpedoes/.

97 Motherboard Staff, "Drug Smuggling With Submarines," *VICE*, July 13, 2009, https://www.vice.com/en/article/aee3ma/drug-smuggling-with-submarines.

Figure 3. Narco Torpedo[98]

Execution of the torpedo method is more complex than using a semi-submersible. The narco torpedo actually requires three fast boats working together: one boat to tow the device, a second boat to act as a decoy for any law enforcement vessels, and a third boat to serve as a recovery platform.[99] The torpedo moves approximately 30 meters below the waterline, so neither an aircraft nor a boat are likely to detect it.[100]

The narco torpedo does have a design flaw. Once the towing vessel stops moving, the torpedo shell surfaces thus becoming visible to either boat or aircraft.[101] Not dissuaded, DTOs have modified the shell so that it remains submerged through a sophisticated ballasting system. Also, in the event of a possible interdiction, towing vessels can release the torpedo leaving it below the water. The profits are not necessarily lost in this case: while the torpedo remains submerged, DTOs detach the torpedo from the boat but not before activating a makeshift beacon system resembling a log of wood from the torpedo's top, which then ascends to the surface, acting as a buoy and as a beacon recognizable only to DTOs. Once the scene is clear, a DTO drug recovery boat can then ensure profits are not lost. Figure 4 depicts the relay method process.

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98 Source: H. I. Sutton, "Narco Submarines, Torpedoes and Semi-Submersibles," Covert Shores Naval Warfare, June 24, 2010, http://covertshores.blogspot.com/2010/06/narco-submarines-torpedoes-and-semi.html.

99 Motherboard Staff, "Drug Smuggling With Submarines."

100 Ramirez and Bunker, "Narco-Submarines," 36.

101 Motherboard Staff, "Drug Smuggling With Submarines."

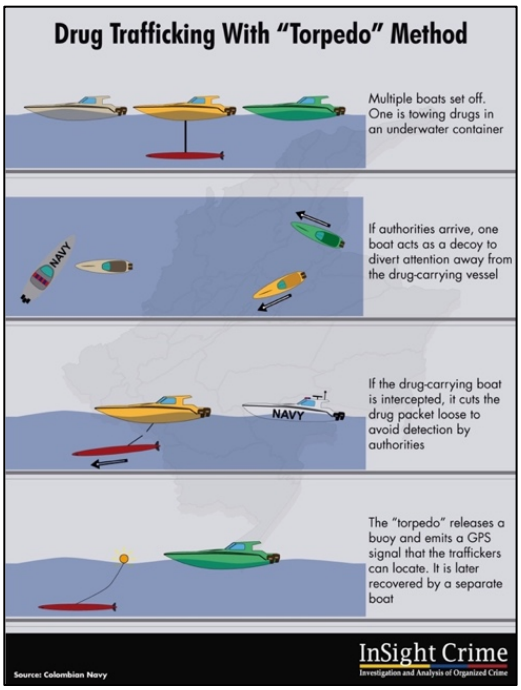

Figure 4. Narco-torpedo Relay Method[102]

DTOs continuously evolve semi-submersibles and narco torpedo engineering, architecture, and technologies to evade detection.[103] However, the interdiction of semi-submersibles over the last few years shows that they can be defeated provided we have the right assets. Military and law enforcement agencies have increased collaborative efforts to minimize the drug movements over water; because we have caught semi-submersibles, we better understand their design. According to Ramirez and Bunker, "these appropriations, in turn, have led to our understanding of how narco-submersibles are designed, engineered, and used to deploy narcotics."[104] With law enforcement improving their success in interdicting semi-submersibles, DTOs have now turned to transit across the ocean below the waterline in fully submersible vessels: they are using submarines.

[102] Source: Mimi Yagoub, "Why Colombia Traffickers Love High-Tech 'Narco Torpedoes."

[103] Ramirez and Bunker, "Narco-Submarines," 9.

[104] Ramirez and Bunker, 17.

4. The Fully Submersible Submarine

In 2010, Ecuadorian authorities located the first diesel-electric fully submersible submarine in a tributary near the Ecuador-Colombia border.[105] DTOs using submersible technology to traffic drugs appears to be evolving faster than anticipated, producing the ideal transport vessel. According to Jay Bergman, the Andean regional director for the DEA from 2006 to 2015, "It is the first fully functional, completely submersible submarine for transoceanic voyages that we have ever found...until now, all the smuggling vessels seized on the high seas or at clandestine shipyards built to haul multi-ton loads of cocaine under the Pacific's surface were semi-submersibles."[106] The discovery of the Ecuadorian submarine shows that DTOs' creativity in search of illegal profits continues.

Similar but previous to the Ecuadorian submarine discovery, in 2017, the Colombian authorities located a fully electric submersible submarine in the Choco area of Colombia near the Panama border.[107] This 30 foot long, 15 foot wide submarine had more than a hundred batteries for power, an electrical jet propulsion engine, and an underwater camera to assist in navigating below the water; it was capable of transporting narcotics into Central America.[108] Authorities claim this vessel required approximately five months of construction at the cost of $1.5 million.[109]

In 2020, the Colombian Navy discovered another drug submarine in Colombia's Choco region, in a Cucurrupi River boatyard.[110] The submarine cost an estimated $1.5 million to build and confiscated building plans indicated it would have transported over six

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105 Associated Press, "Drugs Sub Captured in South American Jungle," *NBC News*, July 4, 2010, https://www.nbcnews.com/id/wbna38083616.

106 Associated Press.

107 Simon Holmes, "Colombian Army Seizes Electrical Drug Narco-Submarine," *Dailymail*, July 28, 2017, https://www.dailymail.co.uk/news/article-4739460/Colombian-army-seizes-electrical-drug-narco-submarine.html.

108 Holmes.

109 Holmes.

110 H. I. Sutton, "Rare Electric Narco Submarine Seized in Colombia," *USNI News*, November 16, 2020, https://news.usni.org/2020/11/16/rare-electric-narco-submarine-seized-in-colombia.

metric tons of cocaine, estimated at $120 million.[111] According to submarine expert H.I. Sutton, "Most narco submarines interdicted by the U.S. Navy and Coast Guard carry around 1.6 metric tons of cocaine, worth approximately $30 to 35 million. The trend had been towards smaller payloads per trip, but the discovery of the new submarine points toward a trend reversal."[112]

Colombian authorities assess that, through the use of multiple batteries, this submarine was capable of transiting for 12 hours, which would equate to approximately 50 nautical miles at a speed of 4 knots.[113] This submarine's endurance and speed alone would make it impossible to reach its final destination without the assistance of another boat. According to Sutton, a towing ring on the submarine's nose, similar to the narco torpedo, would allow for towing "by a larger vessel until close to its destination. It would then make the final leg on its own. Once unloaded, it would be scuttled and join the hundreds of discarded narco subs which litter the seafloor."[114]

The two submarines' designs resembled each other and were found in the same area. According to Sutton, "Although this vessel's design appears to have been active for at least three years, none have been interdicted at sea. This latest discovery by the Colombian Navy is a reminder that these sophisticated drug transports are still being built, inferring that spending more than $1 million is worth the effort for the traffickers."[115] Figure 5 depicts the fully submersible submarine captured in 2020.

[111] Sutton.

[112] Sutton.

[113] Sutton.

[114] Sutton.

[115] Sutton.

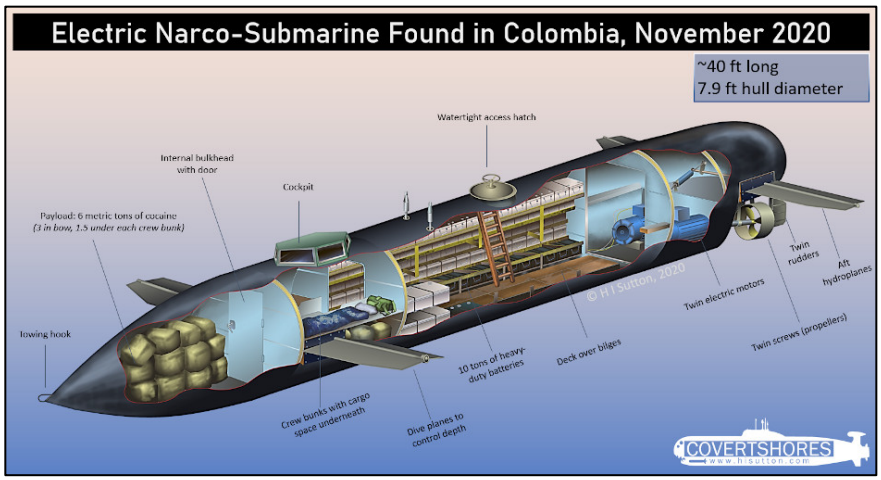

Figure 5. Fully submersible Electric Submarine[116]

While interdicting a go-fast boat presented a challenge, it was not as daunting a one as trying to locate a fully submersible vessel. To date, no reports have emerged of any interdictions of a fully submersible submarine in the open ocean. For DTOs, submarine technology may become the drastic step they need to defeat maritime law enforcement in this five-decade long "cat and mouse" game, meaning many more thousands of lives lost.

B. POLICY AND STRATEGY

Since the 1970s, the United States has been at war over drugs. The ongoing danger resulting from drug use, drug trafficking, and the organized crime that supports it has continuously endangered American lives and jeopardized U.S. economic security. To combat the threat, the U.S. government and law enforcement agencies have prioritized maritime security and drug interdiction as evidenced by our policies and strategic priorities. The 2014 *United States Coat Guard: Western Hemisphere Strategy*, the 2019 *Counterdrug Operations Joint Publication,* and the 2015 *Cooperative Strategy for 21st Century Seapower* offer an understanding of U.S. efforts to deter drug trafficking. The following sections outline U.S. counterdrug policy and strategy as relates to the capabilities we need to meet mission.

116 Source: Sutton.

1. United States Coast Guard: Western Hemisphere Strategy, 2014

The Coast Guard is the lead U.S. organization with authority to enforce maritime law on the high seas, including drug interdiction,[117] and its *Western Hemisphere Strategy* addresses various transnational threats likely to jeopardize both overall U.S. security and the oceans for the next decade.[118] In a layered approach to fighting DTOs, the Coast Guard employs a strategy of cutters, fast boats, and aircraft to interdict vessels carrying drugs that originate from South America, Central America, Mexico, and the Caribbean, bound for Europe and the United States.[119] The *Western Hemisphere Strategy* considers the threats beyond land borders on the open ocean where smugglers are vulnerable to interdiction efforts.[120]

The *Western Hemisphere Strategy* lists specific capabilities from a USCG perspective, such as the National Security Cutter and LEDETs, necessary to succeed in maritime counterdrug operations. The USCG highlights, "the National Security Cutter's speed, endurance, sensors, aviation, and small boat interdiction capabilities are keys to success in the transit zones off the coast of South America and in the Pacific to focus on the departure and chokepoints which offer the best probability of detection and seizure."[121] Vice Admiral Daniel Abel, then Deputy Commandant for Coast Guard Operations, reaffirmed these capabilities in his 2019 testimony before the House Coast Guard and Maritime Transportation subcommittee: "The most capable interdiction platforms include flight deck-equipped [ships], embarked armed helicopters, deployable pursuit-capable boats, and Coast Guard law enforcement detachments embarked on U.S. Navy and allied ships."[122]

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[117] Department of Homeland Security, *Counter Drug Operations*, 2.

[118] Department of Homeland Security, *United States Coast Guard: Western Hemisphere Strategy* (Washington, DC: Department of Homeland Security, 2014), 8, https://www.mycg.uscg.mil/Portals/6/Documents/PDF/CG_West_Hemisphere_Strategy.pdf?ver=2016-10-13-123053-130.

[119] *Western Hemisphere Drug Interdictions: Hearing before the Committee on Transportation and Infrastructure House of Representatives*, 116th Cong. 1 (2019), https://www.govinfo.gov/content/pkg/CHRG-116hhrg39475/pdf/CHRG-116hhrg39475.pdf.

[120] *Western Hemisphere Drug Interdiction Operations: Testimony before the House Coast Guard & Maritime Transportation (CG&MT) Subcommittee,* 116th Cong. (2019) (statement of Daniel Abel, Deputy Commandant for Coast Guard Operations).

[121] Department of Homeland Security, *United States Coast Guard: Western Hemisphere Strategy*, 50.

[122] Abel, testimony on *Western Hemisphere Drug Interdiction Operations.*

In his 2011 Naval Postgraduate School master's thesis, Lance Watkins highlights the importance of the Coast Guard's law enforcement authority:

> The U.S. Coast Guard continues to provide legal and logistical assets for reducing the threat of self-propelled semi-submersibles (SPSS) shipping cocaine. It allows U.S. Coast Guards members to board U.S. Naval vessels and act as legal liaisons known as LEDETs onboard U.S. and allied naval ships acting as a force multiplier in the transit zone. The USCG is able to operate and carry out duties and procedures as law enforcement officers. In addition, the U.S. Coast Guard conducts searches on board fishing vessels as well as looking for contraband and evidence of SPSS association. It is routine for fishing vessels to operate as a replenishment station for fuel and supplies.[123]

In addition to LEDETs, incorporating a HITRON team increases the Coast Guard's chance of a successful interdiction mission. James Loy, then Coast Guard Commandant, noticed that "80 percent of all drugs entering the United States were arriving by sea, with drug DTOs using go-fast boats capable of traveling over twice the speed of Coast Guard cutters."[124] Created in 1998 to defeat the go-fast threat, HITRON initially started with six Coast Guard pilots and four airmen who developed tactics involving helicopters employed from a surface ship and skilled marksmen.[125] Public Affairs Officer Ace Castle for the USCG Atlantic Area explains this concept: "While aboard Navy helicopters, Coast Guard personnel qualified on the weapons systems, mission, and airborne use of force (AUF) tactics, employ warning or disabling shots. Coast Guard precision sharpshooters engage in warning shots and disabling fire when a vessel fails to heave to when ordered to do so."[126] Once HITRON personnel have disabled the vessel, maritime assets in the area can board and arrest any drug smugglers.

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123 Lance J. Watkins, "Self-Propelled Semi-Submersibles the next Great Threat to Regional Security and Stability" (master's thesis, Naval Postgraduate School, 2011), 6, https://calhoun.nps.edu/bitstream/handle/10945/5629/11Jun_Watkins.pdf?sequence=1&isAllowed=y.

124 William Thiesen, "The Long Blue Line: HITRON – 20 Years of Hitting New Highs," *Coast Guard Compass*, September 14, 2017, https://coastguard.dodlive.mil/2017/09/the-long-blue-line-hitron-20-years-of-hitting-new-highs/.

125 William Thiesen.

126 Christopher Woody, "US Navy Helicopters and Coast Guard Snipers Are Firing on Suspected Drug Traffickers," *Yahoo News*, February 2, 2021, https://news.yahoo.com/us-navy-helicopters-coast-guard-222334040.html.

Both research and the *Western Hemisphere Strategy* highlight the importance of multiple capabilities to conduct successful drug interdiction operations, including law enforcement authority, pursuit-capable vessels like cutters and fast-boats, aircraft and boats that can employ them, and HITRON support.

2. Joint Chiefs of Staff: Counterdrug Operations, 2019

Counterdrug operations mainly concentrate on preventing drug trafficking by: discovering maritime routes; tracking, monitoring, and boarding vessels; the capture of contraband and vessels; and the apprehension of smugglers.[127] Title 10 USC Section 279 prohibits the Department of Defense (DOD) from operating directly in maritime boardings; instead, maritime LEDETs embark on Navy and partner nation vessels.[128] Generally, the Coast Guard leads embarkation because they have the legal authority to act as law enforcement, and military forces assist. A 2019 Joint Chiefs of Staff publication (JCS publication) provides guidelines and instructions for preparing, conducting, and assessing U.S. military assistance for counterdrug operations.[129] The JCS publication notes that Navy ships also contribute to the drug interdiction mission by providing D&M functions as they are often nearby to intercept any suspected trafficking vessel.[130]

The JCS publication describes the LEDET as a ten-person team assigned temporarily to Navy or partner nation military vessels when transiting in an area used for drug trafficking. While assigned to a Navy or partner nation ship, LEDETs are governed by a memorandum of understanding (MOU) between the USCG and the respective fleet commander or allied governments.[131] This publication also defines the roles, responsibilities, and command and control structure during interdiction operations involving air assets. Through a signed MOU, the USN and USCG define the roles,

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[127] Joint Chiefs of Staff, *Counterdrug Operations,* JP3-07.4 (Washington, DC: Joint Chiefs of Staff, 2019), i, https://fas.org/irp/doddir/dod/jp3-07-4.pdf.

[128] Joint Chiefs of Staff, 107.

[129] Joint Chiefs of Staff, 55).

[130] Joint Chiefs of Staff, 107.

[131] Joint Chiefs of Staff, 107.

responsibilities, and relationships regarding the employment of AUF from Navy helicopters. The MOU's purpose is training Navy helicopter assets on approved roles, requirements, strategies, techniques, and procedures to support counterdrug missions. Similar to the *Western Hemisphere Strategy,* the JCS publication notes that, "To stop non-compliant vessels with minimal risk of injury or loss of life, USN helicopters are permitted to use AUF (warning shots and disabling fire). The use of warning shots and disabling fire is governed by current USCG policy."[132]

3. U.S. Cooperative Strategy for 21st Century Seapower 2015 Revision

Stressing the importance of cooperation among different agencies and nations, *A Cooperative Strategy for 21st Century Seapower 2015 Revision* (cooperative strategy) describes the growing strategic capabilities of the United States' enemies and focuses on the basic approach and philosophy that maritime forces should adopt.[133] An example of such collaboration in counterdrug operations is with the JIATF-S. According to DHS, "JIATF-S executes the Department of Defense statutory responsibility for detecting and monitoring illicit drug trafficking in the air and maritime domains bound for the United States."[134] In 2019, JIATF-S reported that international partners and allied nations contributed to over 50 percent of interdictions in the Western Hemisphere Transit Zone through joint operations using the interdiction continuum.[135] Figure 6 depicts the interdiction continuum.

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[132] Joint Chiefs of Staff, 27.

[133] Department of Defense, *U.S. Cooperative Strategy for 21st Century Seapower 2015 Revision*, 18.

[134] Department of Homeland Security, *Counter Drug Operations*, 2.

[135] Department of Homeland Security, 4.

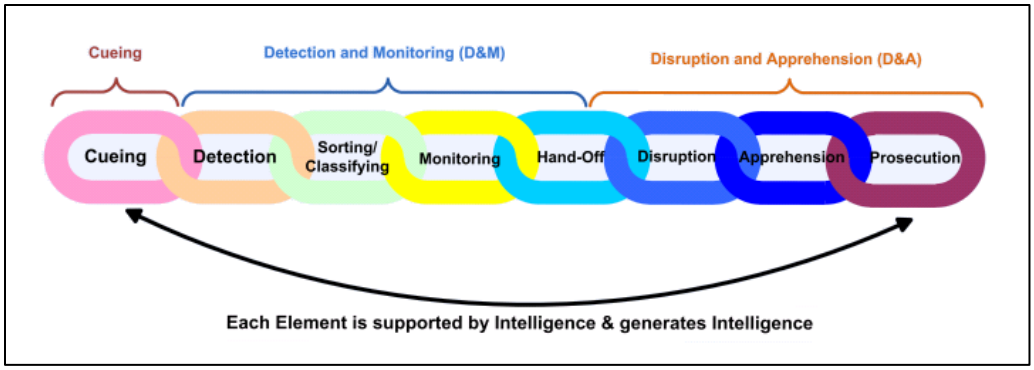

Figure 6. Interdiction Continuum[136]

The use of maritime patrol aircraft (MPA) and surface assets, in coordination with U.S. Customs and Border Protection (CBP), DOD, and allies, combined with JIATF-S cueing capabilities,[137] creates a defensive posture and deters drug trafficking threats transiting in the open ocean. According to the Subcommittee on Coast Guard and Maritime Transportation,

> The interdiction continuum depicts how joint interdiction operations have been used to reduce the supply of cocaine to the United States. A typical operation begins with the collection of actionable intelligence on drug trafficking activities. This is used to help cue or tip the operational unit to narrow its patrol area and decrease response time. Next, CBP, Coast Guard, DOD, or allied nation Maritime Patrol Aircraft (MPA) are launched to detect drug smuggling activities, sort through potential targets, and monitor the suspect vessel(s). The MPA will then contact a nearby Coast Guard, Navy, or allied nation's surface asset (e.g., a cutter, frigate, etc.) and hand-off the vessel. The surface asset will launch a small boat or an armed Coast Guard helicopter manned with Coast Guard Law Enforcement Detachment (LEDET) personnel to disable the vessel. The vessel is then interdicted, the drugs are seized, and the crew is apprehended. Final disposition of the vessel, drugs, and crew is coordinated between the U.S. State and Justice Departments and the flag state of the vessel who handles the prosecution.[138]

Abel highlighted that interdiction information and intelligence, gathered through the various maritime assets and allies, allows for successful interdictions in the open

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[136] Source: H.R., *Western Hemisphere Drug Interdictions*," 8.

[137] Department of Homeland Security, *Counter Drug Operations*, 2.

[138] H.R., *Western Hemisphere Drug Interdictions*," 7.

ocean.[139] Abel further stated that "Assets coupled with both intelligence targeting and dedicated MPA support had nearly double the interdiction rate as opposed to those patrolling ships that had only one or neither of these supporting elements."[140]

The cooperative strategy also shows that increasing SOUTHCOM's deterrent capabilities could help resolve the increasing maritime challenge in the Western Hemisphere.[141] As Admiral Craig Faller argues, "Grey hulls, in particular, still serve as a powerful deterrent, sending a clear message to our competitors, and a reassuring one to our allies."[142] Maintaining a constant presence and providing support in the region is critical in discouraging drug traffickers. Throughout the SOUTHCOM AOR, JIATF-S serves as the lead agency in coordinating daily maritime patrols thus serving a critical role in deterrence.

C. CAPABILITIES NEEDED FOR A COUNTERDRUG PLATFORM

To efficiently, and cost-effectively, counter the threat—which continues to prove itself innovative, adaptable, and capable of using technology and funds to evolve—we need a dynamic and flexible platform as a fundamental part of our own adaptable assets. Based on what we know of DTOs' vessels as well as our policy and strategy, the Navy's counterdrug platform must have the following capabilities.

First, the Navy's counterdrug platform must support Coast Guard LEDET/ HITRON teams. To board drug boats and arrest drug traffickers, the Coast Guard must exercise its legal maritime authority. LEDETs usually deploy with HITRON personnel, and Navy ships must be able to carry and transfer those personnel as part of the interdiction process. Additionally, LEDET/HITRON teams have experienced marksmen that can disable a vessel's engine if the smugglers refuse to stop. LEDETs are trained to conduct contested

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139 Abel, testimony on *Western Hemisphere Drug Interdiction Operations,* 4.

140 Abel, 4.

141 Department of Defense, *U.S. Cooperative Strategy for 21st Century Seapower 2015 Revision*, 18.

142 Sam LaGrone, "SOUTHCOM Faller Lauds LCS USS Detroit Deployment, Asks For More Ships," *USNI News*, January 30, 2020, https://news.usni.org/2020/01/30/southcom-faller-lauds-lcs-uss-detroit-deployment-asks-for-more-ships.

maritime boardings in counterdrug operations while also enforcing maritime law. LEDETs rely heavily on naval vessels to fulfill their mission. In a Naval War College paper, Andrew Edwards argues, "Although LEDETs are dependent on Navy vessels, that dependence is due more to the seamanship capabilities than the warfighting capabilities of the platform…typically, a Navy ship's only job is to support its embarked LEDET and air detachments by being a mobile, floating fortress from which to operate."[143] In addition, utilizing the embarked MH-60R, HITRON marksmen can immobilize any non-compliant watercraft with pinpoint accuracy, damaging a craft's engine from the sky.[144]

Second, the Navy's counterdrug platform must prioritize speed. A vessel needs to be able to keep up with the go-fast threat and to be able to reach a drug-trafficking vessel's location expeditiously. If a vessel cannot keep up or arrive in time, it does not matter what personnel are present; thus, LEDET/HITRON supportability and speed capabilities are almost equally important. However, in addition to the fundamental need for legal authority, if a Navy platform fails to reach the threat in time, it can potentially make up for a speed deficiency if it can employ an aviation asset to locate and maintain contact with the threat.

Third, the Navy's counterdrug platform must be able to employ aviation assets. In addition to aircraft increasing the likelihood of spotting or tracking potential DTO vessels, including semi-submersibles, aviation capability allows for HITRON members to disable a non-compliant vessel from the air. Also, aviation capability provides boarding teams with updated information and overwatch on the situation when approaching the threat.

Fourth, the Navy's counterdrug platform must be able to employ RHIB. RHIB employment is crucial as small boats are primarily utilized to interdict and board a suspected drug boat while keeping the main interdiction platform at a safe distance. RHIBs are also utilized to transport LEDET and Visit, Board, and Seizure Teams (VBSS) to the threat.

The next two chapters weigh the LCS and EPF options against these four necessary capabilities to determine their suitability for the drug interdiction mission.

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[143] Andrew Edwards, "LCS and the Future of CNT Operations in 4th Fleet" (Final, United States Naval War College, 2020), 10, https://apps.dtic.mil/sti/pdfs/AD1105271.pdf.

[144] Edwards, 10.

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III. THE LITTORAL COMBAT SHIP

This chapter examines the LCS's capabilities in conducting counterdrug operations, especially given the Navy's need for a speedy platform that can support LEDET/ HITRON teams and employ air assets and RHIB. The chapter first describes the LCS platforms then examines the capabilities and limitations of the Independence- and Freedom-variants before then weighing LCS capabilities against the Navy's four primary requirements.

A. THE BIRTH OF THE LITTORAL COMBAT SHIP

As the Cold War ended in the early 1990s, the threat of the Soviet Union's maritime fleet also grew quiet. As a result, the Navy did not need to show as much power at sea and shifted its focus to projecting sea power in littoral regions.[145]

A 1992 Department of the Navy whitepaper launched the Naval Doctrine Command, charged with developing a strategy for the future of littoral warfare.[146] In 2001, the Navy announced the Future Surface Combatant program, geared towards developing three new ship classes, one of which was "a smaller combatant called the LCS to counter electric and diesel submarines, small surface attack craft, and mines in heavily contested littoral (near-shore) areas."[147] Former CNO Admiral Vernon Clark documented the deficiencies of the Navy's littoral capabilities across the fleet, such as "lack of enhanced mine warfare capability, lack of shallow-water anti-submarine Warfare capability, and lack of an effective counter to small craft."[148] In FY2005, the Navy began acquiring the first LCS platforms, with 35 more LCS platforms acquired in FY2018 and three in FY2019.[149]

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145 Edmund Handley, "US Navy Littoral Combat Ship LCS Capabilities, Risks, Possible Missions, and Modules to Support Future USMC Operating Concepts" (master's thesis, USMC Command and Staff College, 2010), 4, https://apps.dtic.mil/sti/pdfs/ADA600682.pdf.

146 Department of the Navy, *From the Sea - Preparing the Naval Service for the 21st Century* (Washington, DC: Department of the Navy, 1992), 7, https://www.hsdl.org/?view&did=484786.

147 O'Rourke, *Navy Littoral Combat Ship (LCS) Program*, 2.

148 Handley, "US Navy Littoral Combat Ship," 4.

149 O'Rourke, *Navy Littoral Combat Ship (LCS) Program*, 2.

The original LCS was meant to offer a small, inexpensive yet maneuverable, shallow draft platform, capable of reaching fast speeds, designed to fill operational missions in the littoral region identified by former CNO Admiral Clark.[150] According to the Navy,

> The LCS's primary missions are anti-submarine warfare (ASW), mine countermeasures (MCM), and surface warfare (SUW) against small boats (including so-called "swarm boats"), particularly in littoral (i.e., near-shore) waters. The LCS program includes the development and procurement of ASW, MCM, and SUW modular mission packages. Additional potential missions for LCSs include peacetime engagement and partnership-building operations; intelligence, surveillance, and reconnaissance (ISR) operations; maritime security and intercept operations (including anti-piracy operations); support of Marines or special operations forces; and homeland defense operations.[151]

The Navy decided to construct two different platforms—USS *Freedom* (LCS 1) monohull variant, launched on September 23, 2006, and USS *Independence* (LCS 2) trimaran variant, launched on April 30, 2008.[152] With two different variants competing for the final design and further production, the Navy ultimately asked Congress for approval to order ten platforms of each variant.[153]

1. LCS Class, Independence-variant

The first LCS, Independence-variant, designed by General Dynamics and later constructed by Austal USA, departed from traditional shipbuilding of Navy vessels. Figure 7 shows the USS *Independence* (LCS 2), the lead ship of the class, with a trimaran hull,

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150 Handley, "US Navy Littoral Combat Ship," 7.

151 O'Rourke, *Navy Littoral Combat Ship (LCS) Program*, 2.

152 Robert Carney Powers, "Birth of the Littoral Combat Ship," *U.S. Naval Institute Proceedings*, September 1, 2012, https://www.usni.org/magazines/proceedings/2012/september/birth-littoral-combat-ship.

153 Powers.

which resembles a similar design from Austal Australia known as the Benchijigua Express ferry.[154]

Figure 7. Independence-variant[155]

According to Austal, the LCS trimaran design provides a vessel with less water friction while transiting the open ocean, allowing for greater speeds.[156] Additionally, the LCS trimaran design widens the ship, giving it the largest flight deck amongst the Navy's SCS. One drawback of the hull, however, is that its design and superstructure are composed of aluminum rather than steel, which lightens the ship and reduces the hull's strength.[157]

The Independence-variant has an overall length of 419 feet, a beam of 103.7 feet at its largest breadth, and a shallow draft of 15.1 feet.[158] Its propulsion system utilizes a combination of diesel and gas (CODAG), composed of two LM2500 gas turbine engines

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154 "Benchijigua Express," Austal, January 9, 2015, https://www.austal.com/ships/benchijigua-express.

155 Source: Shannon Renfroe, "USS Independence (LCS 2) Sails in the Eastern Pacific," *DVIDS*, February 27, 2019, http://www.dvidshub.net/image/5139970/uss-independence-lcs-2-sails-eastern-pacific.

156 Austal, "Littoral Combat Ship (LCS)," Austal: Corporate, November 25, 2014, https://www.austal.com/ships/littoral-combat-ship-lcs.

157 Andrea Shalal-Esa, "US Navy Request Raises Issue about Aluminum Ships," *Reuters*, March 16, 2010, https://www.reuters.com/article/navy-aluminum-idUSN1513314120100316.

158 "SURFPAC Littoral Combat Ships Page," U.S. Navy, accessed January 8, 2021, https://www.public.navy.mil/surfor/pages/LittoralCombatShips.aspx.

and two MTU 20V 8000 diesel engines.[159] Combined, running at full power, all four engines give the Independence a speed in excess of 40 knots.[160] With the CODAG propulsion system, the Independence uses four Wartsila waterjets instead of rudders to maneuver quickly at high speeds.[161] Table 1 lists further characteristics and armament for an Independence-variant.

Table 1. Independence-variant Characteristics[162]

Specifications	**Independence-Variant**
Builder	General Dynamics
Length	419 feet
Beam	103.7 feet
Draft	15.1 feet
Range	3,500 nm at 14 knots/ 1,000 nm at full sprint speed
Top Speed	>40 knots
Hangar Space	2 x MH60S or 1 x MH60S and 2 x MQ-8
Watercraft Launch and Recover	Up to Sea State 4
Aircraft Launch and Recover	Up to Sea State 5
Power	2 x GE LM2500 gas turbines 2x MTU 8000 series diesel engines
Waterjets	4 x Wartsila steerable waterjets
Personnel	96; 60 core + 23 aviation detachment + 15 mission package
Weapons	MK 110 57mm gun SeaRAM: 11 RIM-116 missiles 4 x .50 cal machine guns

[159] General Electric, "The LM2500 Engine," GE Aviation, accessed March 28, 2021, https://www.geaviation.com/marine/engines/military/lm2500-engine.

[160] Kaitlin Smith, "Don't Give Up on the Littoral Combat Ship," Text, *The National Interest*, January 10, 2017), https://nationalinterest.org/blog/the-buzz/dont-give-the-littoral-combat-ship-19009.

[161] "USS Independence," Wartsila, accessed March 20, 2021, https://www.wartsila.com/usa/marine/reference.

[162] Adapted from U.S. Navy, "SURFPAC Littoral Combat Ships Page."

2. LCS Class, Freedom-variant

Compared to the Independence, the Freedom, built by Lockheed Martin, represents a more traditional design. Instead of a trimaran hull, the Freedom uses a reinforced steel monohull for durability and a superstructure made of aluminum to reduce overall weight.[163] Figure 8 shows the Freedom-variant.

Figure 8. Freedom-variant USS *Fort Worth* (LCS 3)[164]

The Freedom has an overall length of 387.6 feet, a beam of 57.7 feet, and a draft of 14.1 feet.[165] Similar to the Independence, the Freedom uses a CODAG system equipped with two Rolls Royce MT-30 gas turbine engines and two Fairbanks Morse Colt-Pielstick diesel engines.[166] It is powered by water jets, two of which are steerable and two of which

[163] U.S. Navy, "USS FREEDOM (LCS 1) Littoral Combat Ship," Naval Vessel Register, October 11, 2019, https://www.nvr.navy.mil/shipdetail/shipsdetail_LCS_1.html

[164] Source: Mandy Smithberger and Pierre Sprey, "The U.S. Navy's Redesigned Future Ship Still Won't Fight," *Medium*, December 16, 2016, https://medium.com/war-is-boring/the-u-s-navys-redesigned-future-ship-still-won-t-fight-7b2e066b4705.

[165] "Littoral Combat Ship Class - LCS," U.S. Navy, March 10, 2020, https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2171607/littoral-combat-ship-class-lcs/.

[166] Rolls-Royce, "New U.S. Navy Milestone for Rolls-Royce Gas Turbine," *Defense Aerospace*, June 4, 2008, http://www.defense-aerospace.com/article-view/release/94875/lcs1-powers-up-main-gas-turbine-engines.html.

are static for fixed lift, which allows the ship to achieve speeds over 40 knots.[167] Table 2 lists further characteristics and armament for the Freedom-variant.

Table 2. Freedom-variant Characteristics[168]

Specifications	Freedom-Variant
Builder	Lockheed Martin
Length	387 feet
Beam	57.4 feet
Draft	14.1 feet
Range	3,500 nm at 14 knots, approximately 1,000 nm at full load sprint speed
Top Speed Economical	>40 knots 17 knots
Hangar Space	2xMH60S or 1xMH60S and 1xMQ-8
Watercraft Launch and Recover	Up to Sea State 4
Aircraft Launch and Recover	Up to Sea State 5
Power	2 x Rolls Royce MT30 gas turbine 2x Colt-Pielstick diesel engines
Waterjets	2 x moveable Rolls Royce Kameawa outboard waterjets 2 x fixed boost waterjets
Personnel	96; 60 core + 23 aviation detachment + 15 mission package

a. Engineering concerns

In 2021, the Navy concluded that a mechanical design flaw involving the combining gear in the Freedom had resulted in engineering mishaps aboard multiple ships requiring a full investigation into the matter.[169] This matter dates from 2020, when the

[167] Fincantieri, "Littoral Combat Ship - Freedom Class Frigates," accessed March 29, 2021, https://www.fincantieri.com/en/products-and-services/naval-vessels/lcs/.

[168] Adapted from U.S. Navy, "Littoral Combat Ship Class - LCS."

[169] Sam LaGrone, "Navy Calls Freedom LCS Propulsion Problem Class-Wide Defect, Won't Take New Ships Until Fixed," *USNI News*, January 19, 2021, https://news.usni.org/2021/01/19/navy-calls-freedom-lcs-propulsion-problem-class-wide-defect-wont-take-new-ships-until-fixed.

USS *Detroit* (LCS 7) and USS *Little Rock* (LCS 9) experienced propulsion failures while operating at sea. According to Lockheed Martin officials,

> With just the diesel engines engaged, the ship can make between 10 and 12 knots, but to go any faster, it must engage the gas turbine engines. The combining gear connects power from two large gas turbine engines and two main propulsion diesel engines to the ship's propulsion shafts, which propel the ship through the water with water jets. It is a system with a lot of moving parts and has proven unreliable. Repeated failures in the propulsion train on the Freedom-class littoral combat ships Little Rock and Detroit have raised the specter of a class-wide design flaw that could trigger an expensive reworking of a crucial component on 17 of the Navy's small surface combatants.[170]

The Freedom LCSs currently in the fleet operate under a strict advisory that requires them to work with constraints to preclude the combining gear fault from occurring, unlike the Independence ships with their different propulsion train.[171]

B. MISSION MODULES

The LCS was initially designed as a modular platform to address a plethora of asymmetric threats in the operational environment.[172] The LCS intended to utilize a "plug-and-fight" concept to allow rapid equipment changes in-port: in approximately 1 to 4 days, the ships were supposed to be able to proceed with a different mission package, such as SUW, ASW, or MIW.[173] This thesis focuses only on the SUW and ASW mission packages for the drug interdiction mission.

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170 LaGrone.

171 David Larter, "US Navy Investigates Potential LCS Class-Wide Design Flaw," *Defense News*, December 16, 2020, https://www.defensenews.com/naval/2020/12/15/the-us-navy-is-investigating-a-potential-lcs-class-wide-design-flaw/.

172 Daniel Goure, *Modularity, the Littoral Combat Ship and the Future of the United States Navy* (Arlington, VA: Lexington Institute, 2006), 7, https://lexingtoninstitute.org/wp-content/uploads/modularity_nsf.pdf

173 Sebastien Roblin, "The Navy Spent $30B and 16 Years to Fight Iran with A Littoral Combat Ship That Doesn't Work," *NBC News*, July 19, 2019, https://www.nbcnews.com/think/opinion/navy-spent-30b-16-years-fight-iran-littoral-combat-ship-ncna1031806.

1. Surface Warfare

According to the Navy, "The SUW [mission package] installed on an LCS provides fleet protection from small boats and other asymmetrical threats."[174] This mission package allows for operational security in various interdiction missions such as against smugglers, terrorist suspects, and pirates and protects against coastal threats in the littorals. Also, according to the Navy, "This mission package augments the core LCS sensor and weapons capabilities, providing a layered defense capability for rapidly detecting, tracking and prosecuting small boat threats. Ultimately, this mission package enhances the safety of the Sailors while permitting the mission commander to maintain operational flexibility."[175] The SUW module is composed of the following: a MK 46 Gun Weapon System, a Surface-to-Surface mission module carrying the Longbow missile, an MH-60R helicopter capable of employing Hellfire missiles, M240 and .50 caliber machine guns, an MQ-8 Unmanned Aerial Vehicle (UAV), and a Security Module composed of 11-meter RHIBs and a VBSS team.[176]

2. Anti-Submarine Warfare

According to the Navy, "The ASW mission package provides Joint Force Commanders the ability to conduct detect-to-engage missions against both diesel and nuclear submarines."[177] According to LCS mission module program manager Captain Ted Zobel, the ASW module comprises a Dual-mode Array Transmitter Mission System, an SQQ-89 acoustic processing system, Multi-Function Towed Array, and an MH-60R helicopter.[178] The Navy contends that the ASW mission package was developed to

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174 "Littoral Combat Ships - Surface Warfare Mission Package," U.S. Navy, last modified December 8, 2016, https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2220640/littoral-combat-ships-surface-warfare-mission-package/.

175 U.S. Navy

176 U.S. Navy

177 "Littoral Combat Ships - Anti-Submarine Warfare (ASW) Mission Package," U.S. Navy, last modified December 6, 2016, https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2167531/littoral-combat-ships-anti-submarine-warfare-asw-mission-package/.

178 Stephen Carlson, "LCS Anti-Sub Package Finishes Round of Testing, Navy Says," *Defense News*, December 5, 2018, https://www.upi.com/Defense-News/2018/12/05/LCS-anti-sub-package-finishes-round-of-testing-Navy-says/9861544027621/.

readily provide ASW capabilities when operating in deep and shallow water environments and conducting ASW prosecution on any detected possible submarine, including narco-subs.[179] The ASW mission package comprises advanced equipment, which, as Captain Zobel states, "will provide revolutionary capabilities to the fleet."[180]

3. Mission Module Changes

Again, the LCS mission package is composed of three individual different mission sets: SUW, ASW, and MCM. Each module consists of additional weapons; unmanned aerial, surface, and sub-surface vehicles; manned aircraft; and additional people to empower a vessel to complete the assigned tasking and mission.[181] Unfortunately, the various modules and "plug-and-fight" concepts have encountered numerous obstacles.[182] According to a 2020 Government Accountability Office report, those obstacles meant that the packages could no longer be swapped out:

> The USN LCS packages—composed of weapons, helicopters, boats, sensors, and other systems deployed from an LCS—are intended to provide mine countermeasures (MCM), surface warfare (SUW), and anti-submarine warfare (ASW) capabilities. The USN planned to swap packages among LCS but has now assigned each LCS a permanent package.[183]

In February 2016, the Navy created an LCS review team to examine the operational impact regarding the modularity concept for the LCS mission package. In September 2016,

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179 U.S. Navy, "Littoral Combat Ship," *All Hands Magazine*, accessed March 29, 2021, https://allhands.navy.mil/Features/LCS/.

180 "US Navy Receives Final Component of LCS ASW Mission Package," *Naval Today,* December 6, 2018, https://www.navaltoday.com/2018/12/06/us-navy-receives-final-component-of-lcs-asw-mission-package/.

181 *The Oversight, Acquisition, Testing, and Employment, of the Littoral Combat Ship (LCS) and LCS Mission Module Programs: Hearing before the Committee on Armed Services, Senate,* 114th Cong. 2 (2016), https://www.govinfo.gov/content/pkg/CHRG-114shrg28323/html/CHRG-114shrg28323.htm.

182 Tom Lohr, "Focus Littoral Combat Ships on Antisurface Warfare," *U.S. Naval Institute*, February 2019, https://www.usni.org/magazines/proceedings/2019/february/focus-littoral-combat-ships-antisurface-warfare.

183 Gene Dodaro, *Defense Acquisitions Annual Assessment- Drive to Deliver Capabilities Faster Increases Importance of Program Knowledge and Consistent Data for Oversight*, GAO-20-439 (Washington, DC: Government Accountability Office, 2020), 129.

the Navy released recommendations and program changes from the review team.[184] The LCS review team recommended discarding the modularity concept in favor of a specific LCS with one permanent mission package, giving the theater commander an adaptable modular platform to confront asymmetric threats. As a result, 24 of the planned 28 LCSs will merge into six divisions stationed on each coast, three Independence-variant divisions homeported in San Diego, California, and three Freedom-variant divisions positioned in Mayport, Florida. With each LCS gaining one permanent warfare mission package, the core crew and mission package assigned to the LCS will merge, creating a larger crew size from 60 to approximately 75.[185]

C. NECESSARY CAPABILITIES FOR A DRUG INTERDICTION SHIP

Having reviewed LCS history, variants, and current events, Section C weighs LCS capabilities against the Navy's need for capabilities for: LEDET/HITRON supportability, speed, and employment of air assets and RHIBs in conducting counterdrug operations.

1. LEDET/HITRON Supportability

To legally interdict and arrest drug traffickers, the Navy needs its platform to support a USCG LEDET/HITRON team. Simultaneously, HITRON personnel lend the ability to safely immobilize a non-compliant vessel. Until 1981, Congress authorized the use of DOD services, platforms, and equipment to support federal law enforcement in drug interdiction. However, under the Posse Comitatus Act, DOD personnel are barred from engaging in law enforcement without Congressional authorization. While operating in the SOUTHCOM AOR, Coast Guard LEDETs are regularly deployed aboard naval vessels to enforce legal boardings outlined under 10 U.S.C. §379. Since 2015, the Navy has utilized different ship classes to support the counterdrug mission, including the LCS.[186]

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[184] Megan Eckstein, "Navy Establishes LCS Review Team To Look At Manning, Operations As Fleet Grows," *USNI News*, March 3, 2016, https://news.usni.org/2016/03/02/navy-establishes-lcs-review-team-to-look-at-manning-operations-as-fleet-grows.

[185] Department of Defense, *FY16 Navy Programs: Littoral Combat Ship (LCS)* (Washington, DC: Department of Defense, 2016), https://www.dote.osd.mil/Portals/97/pub/reports/FY2016/navy/2016lcs.pdf?ver=2019-08-22-105304-133.

[186] Department of Homeland Security, *Counter-Drug Operations*, 3.

To properly stop and apprehend drug smugglers, the Navy requires a Coast Guard LEDET. HITRON teams are also required by the Navy to immobilize a non-compliant drug vessel. Because the structural architecture and hangar bay enable the capacity to adequately store and maintain a helicopter onboard, an LCS may transport HITRON personnel and their accompanying aircraft.

2. Speed

The Navy needs speed in its counterdrug platform because a ship must be able to keep up with drug traffickers whose go-fast boats can reach speeds in excess of 35 knots.[187] Additionally, the vessel must be able to reach the potential DTO boat expeditiously. The speed of the Independence makes it especially well-suited for counterdrug interdiction. According to LCS Captain Dan Straub, the LCS can reach speeds up to 40 knots; combined with its maneuverability above the waterline, this speed has a significant impact at the tactical and operational level.[188] Additionally, the Freedom- and Independence-variants can reach highs speed in a few short minutes while generating a backing movement rapidly in a few ship lengths. Straub notes that its ability to generate high sprint speeds "allows the LCS to rapidly reposition to reinforce different groups of civilian vessels requiring protection, enabling a greater economy of force, while tactical agility confers advantages in close maneuvering situations, such as dodging would-be rammers."[189] With the CODAG propulsion system, operators onboard can utilize either gas turbines, diesels, or both. Using only diesel engines at economical speeds allows the LCS to use less fuel than other Navy surface ships, which primarily use gas turbines; less fuel usage increases the time to remain on station before returning to port.[190] With the go-fast boats reaching speeds above 30 knots, the LCS speed is on par to meet this threat.

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[187] Minsky, "Drug Smugglers Love This Janky Boat."

[188] Dan Straub, "Littoral Combat Ships for Maritime COIN," *U.S. Naval Institute*, January 1, 2021, https://www.usni.org/magazines/proceedings/2021/january/littoral-combat-ships-maritime-coin.

[189] Straub.

[190] Straub.

3. Aviation Employment

When it comes to countering drug trafficking threats, speed means little without proper actionable intelligence.[191] Actionable intelligence cues a maritime aviation asset to localize and track any suspected drug trafficking maritime threat while the surface asset speeds towards the threat. How does the LCS stack up in terms of aviation support ability?

The LCS flight deck size and characteristics for both variants are larger than other Navy surface ships such as destroyers or cruisers.[192] According to Straub, the Freedom-variant has a flight deck size of approximately 7,300 square feet—roughly one and a half times larger than a large surface combatant (LSC)—while the Independence-variant has a flight deck size of approximately 11,000 square feet—the largest of any LSC in the fleet.[193] The Freedom-variant flight deck can support up to two MQ-8B/C Fire Scout unmanned helicopters or one MH-60R/S Seahawk manned helicopter. Figure 9 depicts the MQ-8 variant assigned to LCS ships, and Table 3 shows the platform characteristics. Figure 10 illustrates the MH-60S, and Table 4 shows the platform characteristics.

Figure 9. MQ-8B and MQ-8C Fire Scout onboard USS *Independence*[194]

191 H.R., *Western Hemisphere Drug Interdictions*, 9.

192 Straub.

193 Straub.

194 Source: Jennifer Thomas, "UX-24 Expands Fire Scout's Operational Flexibility," *Tester*, July 16, 2020, https://www.dcmilitary.com/tester/tenant_profile/ux-24-expands-fire-scout-s-operational-flexibility/article_3845a86b-1976-5c0f-90ff-a4b88cc6e90e.html.

Table 3. MQ-8B[195] and MQ-8C[196] Specifications

	MQ-8B	MQ-8C
Length	31.5 feet	34.7 feet
Weight	2,000 lbs (empty) / 3,150 lbs (day fuel + payload)	3,200 lbs (empty) / 6,000 lbs (day fuel + payload)
Max speed Cruise speed	85 knots 80 knots	135 knots 115 knots
Service Ceiling	12,500 feet	16,000 feet
Endurance	5.5 hours	12 hours

Figure 10. MH-60R Helicopter[197]

[195] Adapted from Naval Air Systems Command, "MQ-8B Fire Scout," NAVAIR, accessed March 28, 2021, https://www.navair.navy.mil/product/mq-8b.

[196] Adapted from "MQ-8C Fire Scout," U.S. Navy, last modified February 21, 2019, https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2159302/mq-8c-fire-scout/.

[197] Source: Arjit Garg, "A Look at Sikorsky MH-60R 'Romeo' Seahawk Helicopter That Can Hunt Submarines," *News18*, February 26, 2020, https://www.news18.com/news/auto/a-look-at-sikorsky-mh-60r-romeo-seahawk-helicopter-that-can-hunt-submarines-2515129.html.

Table 4. MH-60R and MH-60S[198] Specifications

	MH-60R	MH-60S
Primary Function	ASW, SUW	ASUW, Combat Support, Humanitarian Disaster Relief, Search and Rescue, Medical Evacuation, MIW Countermeasures
Length	64 feet	64 feet
Height	17 feet	17 feet
Weight	14,430 lbs (empty) / 23,500 lbs (max gross)	14,430 lbs (empty), 23,500 lbs (max gross)
Max Airspeed	180 knots	180 knots
Ceiling	13,000 feet	13,000 feet
Range	245 nautical miles	245 nautical miles
Crew	Three	Four

The Independence-variant flight deck, on the other hand, can support more aviation assets simultaneously. Although it is not needed often, the Independence-variant flight deck can support two MH-60R/S simultaneously, either on approach for landing or launching.

To combat the drug interdiction threat, both LCS variants are capable of launching multiple aviation assets to generate a larger maritime picture. As intelligence reports are sent to surface assets, aircraft can be immediately launched and vectored towards the location to localize and track any suspected drug trafficking vessel. The endurance on the MQ-8B/C and MH-60R/S allows an operator extended time in the air to refine the maritime picture, follow a suspected drug vessel, provide situational reports back to the home ship, and give overwatch cover while the main interdiction ship is en route to the drug trafficking threat. When an aircraft finds a suspected drug vessel and relays that information back to

[198] Adapted from Naval Air Systems Command, "MH-60S Seahawk," NAVAIR, accessed March 28, 2021, https://www.navair.navy.mil/product/MH-60S-Seahawk.

the interdiction ship to close the intelligence loop, the interdiction ship arrives at the operating area where the drug vessel is located and deploys an RHIB to board a suspect drug trafficking vessel.

4. Rigid Hull Inflatable Boat Employment

Employing a RHIB is crucial, as small boats are primarily utilized to interdict and board a suspected drug boat while keeping the main interdiction platform at a safe distance. Like all Navy vessels, the LCS variants are capable of deploying multiple RHIBs. With the SUW mission package, an LCS is assigned two 11-meter RHIBs specifically for small boat interdictions. Again, the SUW mission package also provides a VBSS team for any boarding mission, as needed. Numerous LEDET teams may be embarked because of the berthing capacity on an LCS and its mission bay can store multiple RHIBs to serve multiple LEDET teams. Multiple RHIBs can be launched from the Independence and Freedom variant.

Figure 11 shows how the Freedom-variant can deploy both a 7- and 11-meter RHIB utilizing the stern door located behind the ship.

Figure 11. Freedom-variant RHIB Launch[199]

[199] Source: "Freedom Class LCS Littoral Combat Ship U.S. Navy," Seaforces, accessed March 28, 2021, https://www.seaforces.org/usnships/lcs/Freedom-class.htm.

This employment design allows for immediate launch and recoveries at a moment's notice. One RHIB is loaded into the stern ramp utilizing a moveable boat skid, which allows for immediate use.

Figure 12 shows how the Independence-variant instead utilizes a crane mechanism called the Twin Boom Extendable Crane to load, lower, and launch one 11-meter RHIB at a time.

Figure 12. Independence-variant Launching an 11-meter RHIB[200]

In addition, the Independence-variant also carries one 7-meter RHIB located on the port-quarter (back left corner) of the ship. Although this potentially allows the Independence-variant to launch three small boats, the 7-meter RHIB serves as a ready lifeboat if the two larger RHIBs are out of service.

Considering the drug threat in the open ocean, having one main interdiction ship and multiple RHIBs, with aviation assets, allows for greater opportunity to interdict drug trafficking threats, whether they be numerous narco submarines trying to sneak by or three fast boats conducting the narco-torpedo method. The 7-meter RHIB operates at a maximum

200 Source: "Independence Class LCS Littoral Combat Ship U.S. Navy," Seaforces, accessed January 8, 2021, http://www.seaforces.org/usnships/lcs/Independence-class.htm.

speed of 31 knots and carries approximately 18 people[201] while the 11-meter RHIB achieves speeds excess of 45 knots and can carry up to 26 people.[202] Although the 7-meter can be utilized as an interdiction/boarding vessel, it is primarily used as a ready lifeboat for emergency situations such as search and rescue. When an LCS is outfitted with the SUW mission package, the 11-meter RHIBs are the primary interdiction assets due to their increased speed and higher passenger capacity to transport smugglers and their illegal cargo.

D. ANALYSIS

Both LCS platforms meet the requirements to support counterdrug missions. In a SASC Committee report, Admiral Craig Faller stated, "Counter-narcotic operations demand platforms for the endgame, working with law enforcement to take both the detainees we gain intel from and drugs off the street."[203] However, the Freedom's internal mechanical design drastically decreases the speed capability within the class.

The Navy will be taking an operational risk if the Independence-variant operates at high speeds while the combining gear issue remains uncorrected. As stated, the Freedom-variant can generate approximately only 10 to 12 knots with only the diesel engines. That speed reduction, necessary for safety given the uncorrected design issue, will drastically decrease interdiction capabilities for the common maritime drug threat—the go-fast boat. The Freedom-variant will still be able to pursue fishing trawlers and submersibles, but it will also be slow to rendezvous to an operating area in response to any maritime drug threat. Delayed arrival to the operating area means a potential missed opportunity to act on intelligence and interdict drug traffickers.

As a result, both aviation and HITRON/LEDET employment becomes even more critical to compensate for the relative slow speed. With the speed degradation, the

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201 "Sea Force 700," Willard Marine, accessed March 25, 2021, http://www.willardmarine.com/images/brochures/SEAFORCE700.pdf.

202 "11 Meter Naval Special Warfare Rigid Inflatable Boat (RIB)," U.S. Navy, last modified January 9, 2017, https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2171633/11-meter-naval-special-warfare-rigid-inflatable-boat-rib/.

203 LaGrone, "Destroyers Continue to Prowl 4th Fleet."

Independence-variant serves as a more versatile platform to combat the various maritime drug trafficking threats. Overall, the LCS platforms are suitable for the drug interdiction mission; Table 5 summarizes their capabilities and deficiencies.

Table 5. LCS and Interdiction Factors

Factor	Independence	Freedom
Speed	+	—
Aviation	+	+
RHIB	+	+
LEDET/HITRON	+	+

E. CHAPTER CONCLUSION

The LCS program objectives were to acquire and deliver an SSC platform that was inexpensive, stealthy, and had a versatile mission package concept to allow "plug-and-fight" for different warfare areas. With design flaws, engineering concerns, and failure of mission package diversity, the LCS program failed to meet the original expectations, which brought into question the LCS platform's viability to support the drug-interdiction mission.

The LCS platforms pose an ability to combat maritime drug trafficking and provide Combatant Commanders, specifically SOUTHCOM, with the capabilities and requirements for an LCS to be an elected maritime drug interdiction platform, similar to the OHP Frigates. As stated, the known Freedom-variant engineering flaw makes the Independence-variant a more capable platform for the various drug trafficking threats. Nonetheless, both the Independence- and Freedom-variants are able to conduct counterdrug interdiction operations.

IV. THE EXPEDITIONARY FAST TRANSPORT SHIP—A CREATIVE SOLUTION

This chapter examines the EPF's capabilities in conducting counterdrug operations, especially given the Navy's need for a speedy platform that can support LEDET/ HITRON teams, air assets, and RHIBs. The chapter first describes the EPF platforms then examines their capabilities and limitations before then weighing EPF capabilities against the Navy's four necessary capabilities for a platform.

A. THE EXPEDITIONARY FAST TRANSPORT

The EPF vessel is a one-of-a-kind aluminum hybrid, combining high-speed transportation with ferryboat architecture, weighing in over 1,600 tons and with an overall length of 338 feet, making it the maritime equivalent of a cargo plane.[204] According to analyst Jean Grace of the National Defense Industrial Association, the EPF's "mission is logistical in nature, able to rearrange and reconfigure medium payloads of supplies and operational units for transport into areas that traditional deep-draft vessels may be unable to access."[205] Peterjohn Gangcuangco, Theodore Awa, and Kendrick Garrett, in their master's thesis, note that the EPF is operated primarily by a crew of 41 civilian mariners versus Sailors but can embark military personnel; it has 144 berthings and seats over 300 people.[206] The vessel is also capable of "soft power" missions such as humanitarian assistance and disaster relief, joint military drills, and diplomatic engagements.[207] However, to safely operate in higher threat environments, the EPF requires an escort by a combatant vessel, such as a destroyer, cruiser, or an LCS.[208]

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[204] Peterjohn Gangcuangco, Theodore Awa, and Kendrick Garrett, "Littoral Combat Ship and Expeditionary Fast Transport: Their Utility As Support Platforms During Humanitarian Aid / Disaster Relief Operations" (master's thesis, Naval Postgraduate School, 2020), 14, https://calhoun.nps.edu/bitstream/handle/10945/66642/20Dec_Gangcuangco_Awa_Garrett.pdf?sequence=1&isAllowed=y.

[205] Gangcuangco, Awa, and Garrett, 14.

[206] Gangcuangco, Awa, and Garrett, 21.

[207] Jean, "Aluminum 'Truck' Joint High Speed Vessel," 34.

[208] Gangcuangco, Awa, and Garrett, "Littoral Combat Ship And Expeditionary Fast Transport," 15.

1. History

Initial U.S. interest in high-speed catamarans dates from 1999, when the Royal Australian Navy deployed the 86-meter high-speed catamaran *Jervis Bay* to support the East Timor crisis and subsequent joint exercises in 2000.[209] A 2006 memorandum from the then-Under Secretary of Defense for Acquisition, Technology, and Logistics, Kenneth Krieg, detailed the specifications and authorized the initial review and assessment of the Joint High Speed Vessel (JHSV). The memorandum called for the procurement of a vessel capable of reaching high speeds, with a shallow draft and with personnel and cargo lift capabilities. Additionally, Krieg states in the memorandum:

> Future joint forces will be responsive, deployable, agile, versatile, lethal, survivable, and sustainable. The nation will need lift assets that can provide for assured access, decrease predictability and dwell time, and have the capacity to quickly deliver troops and equipment together in a manner that provides for unit integrity. The JHSV will provide combatant commanders high-speed intra-theater sealift mobility with inherent cargo handling capability and the agility to achieve positional advantage over operational distances. Not limited to major ports, the JHSV will be able to operate in austere environments.[210]

In his 2016 master's thesis, Brian Watson noted that the Navy's JHSV experiment looked into commercial catamarans for military intra-theater lift capabilities.[211] Initially, the experiment looked into a high-speed vessel (HSV) known as the Joint Venture (HSV X1), which used both Army and Navy forces to demonstrate how existing commercial technology could be adapted for military application.[212] Under Army use, HSV Joint

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209 Kenneth Krieg, "Joint High Speed Vessel (JHSV) Program Technology Development Strategy" (official memorandum, Washington, DC: Department of Defense, 2006), https://myclass.dau.edu/bbcswebdav/institution/Courses/Deployed/TST/TST204%20and%20TST204V/Archives/March%2017%20Student%20Files/Student%20CD/1%20References/11%20Sample%20Documents%20%26%20Templates/TDS%20JHSV.pdf#:~:text=Joint%20High%20Speed%20Vessel%20(JHSV)%20will%20provide%20combatant%20commanders%20high,operate%20in%20austere%20port%20environments.

210 Krieg, 1.

211 Brian Watson, "Case Analysis of the Joint High-Speed Vessel Program: Defense Acquisition" (master's thesis, Naval Postgraduate School, 2016), xv, https://calhoun.nps.edu/bitstream/handle/10945/50506/16Sep_Watson_Brian.pdf?sequence=1&isAllowed=y.

212 Watson, 3-4.

Venture conducted logistical and military operations while operating in the Persian Gulf supporting Operation Iraqi Freedom.[213] Under Navy use, the HSV Joint Venture deployed as a command and control (C2) platform for a mine warfare readiness group in the Gulf of Mexico.[214] Results from both proved a positive impact from the JHSV on military operations.

After further testing, the Army, Navy, and Marine Corps leased three catamaran vessels for technology demonstrations.[215] The Army leased the Spearhead Theater Support Vessel (TSV) (TSV-1X) to conduct logistical operations.[216] Spearhead served in a military support capacity during Operation Enduring Freedom and demonstrated its usefulness in supporting and sustaining combat operations relating to the Army's Title 10 role for water transport.[217] The Navy used the HSV Swift as a support platform in conducting mine clearance operations, and the Marine Corps used the Westpac Express as a connector, highlighting its transport capabilities between sea and shore.[218]

The Navy and Marine Corps experiments centered on executing missions in implementing the Navy's Sea Power 21 concept.[219] The Navy's HSV Swift demonstrated its principal roles in force protection, fleet support, and humanitarian assistance. This concept had three parts: Sea Strike, Sea Shield, and Sea Basing. In Sea Basing, the JHSV allows for sea bases where the Navy and Marine Corps can, together, stage and project military force, a huge advantage. The MV Westpac Express (HSV 4676), a catamaran that transports Marines and freight throughout the Western Pacific, demonstrated the power of the Sea Basing concept and in moving troops between power projection platforms on land

213 Watson, xv.

214 Watson, xv.

215 Watson, xv.

216 Watson, xv.

217 Watson, xv.

218 Watson, xv.

219 Vern Clark, "Sea Power 21: Projecting Decisive Joint Capabilities," *U.S. Naval Institute*, October 1, 2002, https://www.usni.org/magazines/proceedings/2002/october/sea-power-21-projecting-decisive-joint-capabilities.

and sea for the Marine Corps.[220] In September 2015, then Navy Secretary Ray Maybus formally changed the JHSV class to the EPF so as to have a traditional three-letter name and also to highlight the E-class of ships as expeditionary transport vehicles.[221] Initially, DOD planned for ten ships in the Spearhead class: five for the Army and five for the Navy.[222]

2. Concept

In its mature version, the EPF operates as a high-speed, shallow draught cargo vessel. It is a Small Water-plane Area Twin Hull with jet propulsion, built at the same Astral Shipyards that constructs the Independence-variant LCS.[223] According to Rusty Murdaugh, Austal USA's chief financial officer, "At its core, the EPF is designed to be highly capable, flexible, and affordable. With this baseline, we've been able to deliver multiple ships that are performing different missions for the U.S. military."[224] The EPFs entering the fleet serve as an auxiliary vice combat ship operated by civilian mariners under the Military Sealift Command (MSC) construct.[225] As an MSC platform, an EPF's self-defense capability will be limited to .50-caliber machine guns operated by an embarked military security detachment to increase its self-defense capabilities.[226] Figure 13 depicts the USNS *Newport* (EPF 12).

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220 Watson, "Case Analysis of the Joint High-Speed Vessel Program," xvi.

221 Megan Eckstein, "Navy Renames Three Ship Classes, Creates 'Expeditionary' Designator in Naming System," *USNI News*, September 4, 2015, https://news.usni.org/2015/09/04/navy-renames-three-ship-classes-creates-expeditionary-designator-in-naming-system.

222 Gregory Zimmerman, "The U.S. Navy Littoral Combat Ship: Current Issues and How to Employ It in the Future" (master's thesis, USMC Command and Staff College, 2012), 18, https://apps.dtic.mil/sti/pdfs/ADA601555.pdf.

223 Zimmerman, 18.

224 Richard Burgess, "Navy Orders 15th Expeditionary Fast Transport from Austal," *Seapower*, March 1, 2021, https://seapowermagazine.org/navy-orders-15th-expeditionary-fast-transport-from-austal/.

225 Sykes, "USNS Burlington Carries out Proof-of-Concept Testing."

226 Marine Corps Forces South, "Task Force Marines Integrate With Navy, Provide Security Aboard USNS Burlington," United States Marine Corps, October 2, 2020, https://www.marines.mil/News/News-Display/Article/2369913/task-force-marines-integrate-with-navy-provide-security-aboard-usns-burlington/.

Figure 13. USNS *Newport* (EPF 12)[227]

EPFs can affect their AORs in various ways.[228] They can rapidly transport large amounts of equipment and personnel in a given AOR, enabling effective adaptation and response. They can also be outfitted with specially designed CONEX containers for counterdrug D&M. Although the ship is currently unarmed, it has enough flexibility to incorporate different weapons to function as both an offensive and defensive platform in a benign environment.[229]

The EPF was designed as a high-speed ferry for missions like those carried out by the MV Westpac Express.[230] The EPF has a flight deck for helicopter and UAS operations and a ramp for offloading vehicles quickly. However, when it comes to finding new ways to move missions forward, the EPF is rapidly proving to be a much more flexible asset than just a transport vessel.[231]

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[227] Source: Xavier Vavasseur, "Austal USA Delivers 12th Spearhead-Class Expeditionary Fast Transport (EPF) Ship to U.S. Navy," *Naval News*, September 3, 2020, https://www.navalnews.com/naval-news/2020/09/austal-usa-delivers-12th-spearhead-class-expeditionary-fast-transport-epf-ship-to-u-s-navy/.

[228] Henry Hendrix, "Influence Squadrons Are Here, But Will We Use Them?," *U.S. Naval Institute*, May 1, 2014, https://www.usni.org/magazines/proceedings/2014/may/influence-squadrons-are-here-will-we-use-them.

[229] Hendrix.

[230] Robert Hein, "Maintenance, Modernization & Modules," *U.S. Naval Institute*, July 24, 2015, https://www.usni.org/magazines/proceedings/2015/july/maintenance-modernization-modules.

[231] Hein.

3. Capabilities

EPFs serve a critical role as a strategic connector and small mothership. The Spearhead-class EPFs can hold everything from troops to more than 600 metric tons of cargo, and they have a mission bay of 20,000 square feet for versatility and a mission range of 1,200 nautical miles.[232] The EPF can efficiently transport soldiers, tanks, helicopters, and small boats over long distances. According to Navy Captain Henry Hendrix, "Tomorrow [the EPF] could integrate a number of custom-built mission packages from unmanned aerial vehicles (UAV) support to long-range sensors that could take the utility of these relatively cheap platforms ($400 million per ship) in radically different directions."[233] The EPF's large beam and capacity have substantial logistical capabilities, but the vessel's catamaran nature makes it impossible to operate efficiently in turbulent conditions.[234] Table 6 lists the specifications for the EPF.

Table 6. EPF Specifications[235]

Specifications	EPF
Builder	Austal
Length	337.9 feet
Beam	93.5 feet
Draft	12.5 feet
Speed (Average/Max)	35 knots with payload / 43 knots (without payload)
Range	1200NM Max transit/5600nm self-deployment
Aviation	1 x helicopter landing area (up to a CH-53)
Propulsion	4 x MTU 20V 80000 M71 Diesel Engines
Waterjets	4 x Wartsila WLD 1400 SR
Personnel	Civilian Mariners (able to support up to 104)
Weapons	4 x .50 caliber machine guns

232 Gangcuangco, Awa, and Garrett, "Littoral Combat Ship And Expeditionary Fast Transport," 15.

233 Hendrix, "Influence Squadrons Are Here, But Will We Use Them?"

234 Jean, "Aluminum 'Truck' Joint High Speed Vessel," 34–36.

235 Adapted from Austal, "Expeditionary Fast Transport (EPF)," Austal USA, October 20, 2015, https://usa.austal.com/ships/expeditionary-fast-transport-epf.

B. ELEMENTS FOR A DRUG INTERDICTION SHIP

This section weighs the EPF capabilities against the Navy's requirements for LEDET/HITRON supportability, speed, and employment of air assets and RHIBs in counterdrug operations.

1. LEDET/HITRON Supportability

Again, the Navy requires a Coast Guard LEDET to lawfully intercept and arrest narcotics smugglers. The EPFs' berthing capacity allows for multiple LEDET teams to be embarked,[236] and its large mission bay can store multiple RHIBs to support multiple LEDET teams.

Additionally, the Navy requires HITRON personnel to immobilize a non-compliant narcotics vessel. An EPF cannot embark HITRON personnel and their associated aircraft as the structural design leaves it with no hangar bay to properly store and maintain a helicopter onboard. Thus, to use HITRON personnel would require a rotary aircraft from an additional surface ship to launch, recover, and store an aircraft in its hangar, meaning an EPF would need to work in tandem with other surface ships while conducting counterdrug operations.

2. Speed

The ability to keep up with DTOs' go-fast boats is a vital consideration for any ship platform involved in counterdrug operations. The speed of the Spearhead class EPF makes it especially well-suited for the drug interdiction mission. With the go-fast drug trafficking threat reaching speeds above 30 knots, the EPF's speed capacity is on par to match this threat. Like the LCS, the EPF utilizes four Wartsila waterjets and four MTU diesel engines that produce over 12,000 hp. Without any payloads onboard, the EPF has a maximum speed of 43 knots, and, with cargo on board, the EPF still has a running speed of 35 knots, which produces a range of 1,200 nautical miles.[237] With an aviation asset such as a helicopter on

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[236] LaGrone, "Low Cost Ship Options for U.S. Navy's Drug War."

[237] Ken Hocke, "Austal USA Completes Sea Trials for Navy Fast Transport Vessel," *Workboat*, August 4, 2020, https://www.workboat.com/shipbuilding/austal-usas-expeditionary-fast-transport-12-successfully-completes-sea-trials.

board, the EPF can easily reach the speeds of a go-fast boat. However, the EPF has strict Safe Operating Envelopes that significantly limit its speed capability. Efficiently using the EPFs' maximum speed capability requires a sea state not to exceed Sea State 3, where the waves reach a maximum height of 4 feet; once an EPF operates in Sea State 3, the ship must reduce speed to reduce any damage to the hull.[238]

3. Aviation Employment

As Chapter II noted, speed means nothing in countering the drug trafficking threat without actionable intelligence. While the surface asset races to the threat, actionable intelligence cues a maritime aviation asset to localize and monitor any potential drug trafficking threat. This section considers the EPF's aviation capabilities.

The current EPFs have a flight deck for landing and launching helicopters as wide as the CH-53, the Marine Corps' heaviest helicopter.[239] However, the EPF currently lacks a helicopter hangar, leaving it unable to embark a helo detachment, though discussions have been held to embark a detachment in future platform modifications.[240]

Another new aviation concept for the EPF is using unmanned aerial systems (UAS) to support the drug interdiction mission. As intelligence reports are sent to surface assets, UAS can be launched and vectored to localize and track any suspected drug trafficking vessel. During a 2015 U.S. Naval Forces Southern Command (NAVSOUTH) Fleet Experiment, two UASs were deployed from the USNS *Spearhead* (EPF 1) supporting broader maritime C2 capabilities, Scan Eagle and the RQ-20A Puma.[241] Experiment lead LT Mark Bote stated:

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238 Michael Gilmore, "Document: Joint High Speed Vessel Follow-on Operational Test and Evaluation Report," *USNI News*, October 16, 2015, https://news.usni.org/2015/10/16/document-joint-high-speed-vessel-follow-on-operational-test-and-evaluation-report.

239 Gangcuangco, Awa, and Garrett, "Littoral Combat Ship And Expeditionary Fast Transport," 15.

240 Edward Lundquist, "Being in More Places at Once Calls for Both Large and Small Platforms: Expeditionary Fast Transport Can Provide Logistics Support at the End of the Supply Chain," *Defense Transportation Journal* 75, no. 5 (October 2019): 20–25, http://www.jstor.org/stable/26927738.

241 Gary Loten-Beckford, "USNS Spearhead, SPS-JHSV 2015 Complete Fleet Experimentation Period Two," *DVIDS*, July 23, 2015, https://www.dvidshub.net/news/173577/usns-spearhead-sps-jhsv-2015-complete-fleet-experimentation-period-two.

> The idea of the dual-UAV operations was to determine how Puma and Scan Eagle could fit into potential adaptive force packages in the future and how to use the [EPF] in a more diverse way. What we were looking for with these UAVs to do is to help do especially the monitoring portion of that [counter-trafficking] mission set, to help with ISR (intelligence, surveillance, and reconnaissance), to find and detect and then monitor the boats that are around the area.[242]

Similar to the LCS platforms, the EPFs use of the Scan Eagle and Puma have different aviation capabilities. The Scan Eagle has an endurance time of 18 hours.[243] In contrast, the Puma is limited in endurance with a total of 3+ hours to detect and monitor a suspected drug vessel and provide situational reports back to the home ship while the main interdiction ship is en route to the drug trafficking threat. Figure 14 illustrates the Scan Eagle; Figure 15 shows the Puma; and Table 7 presents a comparison between the two platforms.

Figure 14. Scan Eagle Launched onboard USNS *Spearhead*[244]

[242] Loten-Beckford.

[243] "Scan Eagle," Insitu, accessed May 23, 2021, https://www.insitu.com/products/scaneagle.

[244] Source: Katie Cox, "USNS Spearhead Scan Eagle Launch," U.S. *Navy Public Affairs Support Element East*, July 19, 2018, https://www.dvidshub.net/image/4576753/usns-spearhead-scan-eagle-launch.

Figure 15. RQ-20A Puma[245]

Table 7. Scan Eagle[246] and Puma[247] Specifications

Specifications	Scan Eagle	Puma
Length	5.6. ft.	4.6 ft.
Wingspan	10.2 ft.	9.2 ft.
Sensors/Data	EO camera, Analog/digital video (encrypted), C2 Datalink (encrypted/unencrypted)	EO/IR camera
Endurance	18 hours	3+ hours
Max Altitude Ceiling	19,500 ft.	500 ft.
Max Speed	80 knots	20 to 45 knots

In addition to the Scan Eagle and Puma, during a 2013 operation, NAVSOUTH conducted a one-month demonstration with the Raven Aerostar Tethered Aerostat System onboard the HSV-2 Swift to meet a critical surveillance solution in the Caribbean Basin.[248]

[245] Source: "Puma AE RQ-20A," AeroVironment, accessed May 27, 2021, https://www.avinc.com/images/uploads/product_docs/PumaAE_Datasheet_Web_v1.2.pdf.

[246] Adapted from Insitu, "Scan Eagle."

[247] Adapted from AeroVironment, "Puma AE RQ-20A."

[248] Raven Industries Inc., "Photo Release-Raven Industries Persistent Surveillance Solution Supports U.S. Navy South Maritime Operations," Intrado GlobeNewswire, June 10, 2013, https://www.globenewswire.com/news-release/2013/06/10/553145/14798/en/Photo-Release-Raven-Industries-Persistent-Surveillance-Solution-Supports-U-S-Navy-South-Maritime-Operations.html.

Raven Aerostar program manager Craig Laws stated, "The HSV-2 pulled the aerostat over 3,000 nautical miles during the course of downrange operations, topping out at a ship speed of 28 knots."[249] However, unfavorable weather conditions can make operating the Aerostat more difficult. For example, during a June 2014 exercise, an Aerostat deployed from the USNS *Spearhead* was damaged by lightning, causing it to deflate and crash in the ocean. As a result, the disabled Aerostat threatened to become a navigation safety hazard to other ships.[250] Figure 16 depicts the Raven Aerostar Tethered Aerostat System onboard the HSV-2 Swift.

Figure 16. Tethered Aerostat Radar System[251]

In addition, the HSV-2 also simultaneously employed the Puma as an ISR platform during operations, using a system-of-systems approach. Information from the Aerostar and Puma can be shared with the JIATF-S, which coordinates interdiction assets and disseminates intelligence to Caribbean Basin partner nations. The Aerostar can generate

[249] Raven Industries Inc.

[250] U.S. Naval Forces Southern Command, "Ship's Tethered Balloon Destroyed by Lightning," *Defense Aerospace*, June 13, 2014, https://www.defense-aerospace.com/articles-view/release/3/154641/usnavso%C2%A7us-4th-fleet-statement-regarding-aerostat.html.

[251] Source: Raven Industries Inc., "Photo Release-Raven Industries."

essential situational awareness across a large area. According to the Counternarcotics Program Manager/Unmanned Systems Commander NAVSOUTH Ted Venable, "By incorporating this system on a moving vessel, it provided a broad picture of the surface and air traffic around the HSV Swift."[252]

With such a large area in which to detect and monitor drug trafficking vessels, spanning both the Caribbean Sea and the eastern Pacific Ocean, the EPF's capability to launch various aviation assets like the LCS to generate a larger maritime picture is a game-changer for SOUTHCOM. As soon as surface vessels receive intelligence alerts, SOUTHCOM can vector aircraft to the area to locate and monitor any potential drug trafficking vessels. The endurance of the Scan Eagle and Puma, combined with the Tethered Raven Aerostar, allow for more time in the air to fine tune the maritime picture, detect and track a suspected drug vessel, and provide situational updates back to the home ship while it is en route to the drug trafficking threat. However, unlike the LCS MH-60R, the Scan Eagle, Puma, and Aerostar cannot employ weapons.

4. RHIB Employment

Employing a RHIB is crucial for an interdiction ship as they are primarily utilized to interdict and board a suspected drug trafficking vessel. The EPF can deploy a 7-meter RHIB using the stern crane located behind the ship.[253] However, the crane design for employing and recovering a RHIB results in a slow and dangerous process.[254] Like the LCS, one RHIB is transported to the stern platform utilizing a moveable boat skid. Figure 17 depicts that part of the launch process.

252 Raven Industries Inc.

253 "Expeditionary Fast Transport (T-EPF) Unmanned Systems," Naval Drones, accessed May 13, 2015, http://www.navaldrones.com/T-EPF.html.

254 Naval Drones.

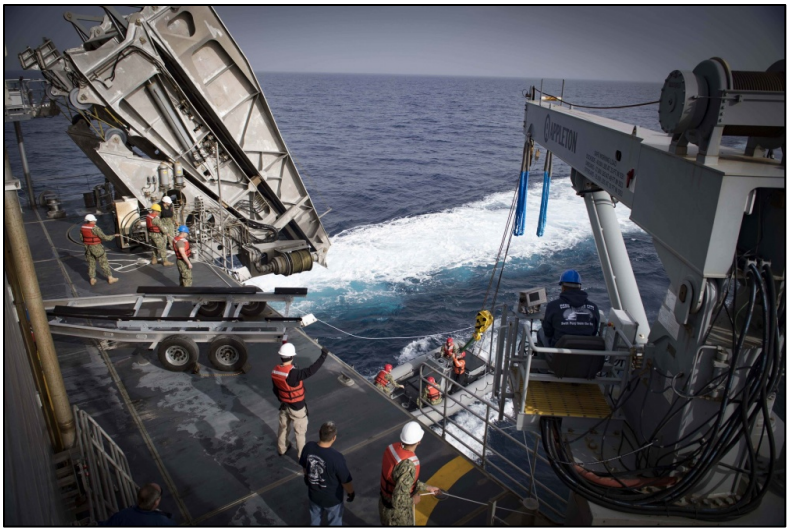

Figure 17. RHIB Launch from an EPF[255]

The EPF's large mission bay means storage capacity for multiple RHIBs. During the Southern Partnership Station 2017 (SPS 17) exercise across Central and South America, the USNS Spearhead was outfitted with only a secondary RHIB, demonstrating the importance of having additional RHIBs. A Navy lessons learned report revealed multiple times when having access to a secondary small boat would have proved helpful for the USNS Spearhead while conducting mission support operations, especially if the Spearhead's SOLAS FRB (lifeboat) breaks down.[256] The SOLAS FRB is specifically designated for a man overboard situation and for corralling the life rafts in an abandon ship scenario, not for mission support operations.

However, unlike the LCS, deploying the RHIB requires no personnel on the RHIB while utilizing the crane. The cargo crane for RHIB launch and recovery is not certified for manned lift or operations greater than Sea State 2.[257] Additionally, this increases the amount of time needed for the RHIBs to deploy with personnel on board as it has to be picked up and lowered into the water behind the ship, and then the crew members get on

255 Source: Ford Williams, "USNS CARSON CITY," *DVIDS*, March 3, 2018, http://www.dvidshub.net/image/4189641/usns-carson-city.

256 "Navy Lessons Learned Information System," U.S. Navy, accessed May 30, 2021, https://www.jllis.mil.

257 U.S. Navy.

via a ladder. The crane has the weight capacity to lift the RHIB with personnel but needs to be safety-certified or else receive a new crane for this to happen.[258]

C. ANALYSIS

Overall, the capabilities of the EPF do not render it a successful interdiction platform. The EPF's lack of an onboard hangar significantly limits its capacity as a drug interdiction platform. In a 2018 7th Fleet Theater Security Cooperation exercise, the initial planning phase contemplated the feasibility of embarking a helicopter detachment on an EPF.[259] The findings during the initial planning phase identified multiple issues, including the lack of maintenance spaces onboard for the helicopter detachment and the arrangement of the maintenance fly–away kit, which would require storing the kit in the mission bay, causing it to be hand-carried up two decks to reach the aircraft. Larger kit items, however, involve the use of the ship's stern crane. Both situations would depend significantly on the sea state as to whether safe movement around the ship was safe. The 7th Fleet ultimately did not embark the helicopter detachment since the Required Operational Capabilities/ Projected Operating Environment (ROC/POE) for the EPF did not include long–term helicopter embarkation as an essential capability.[260] Overall, the cost of embarking a helicopter does not outweigh its benefits. Exercise planners determined that embarking a helicopter and its detachment should not be a planning factor for future missions on an EPF.

Additionally, the EPF stern crane situation severely limits RHIB and LEDET employment. Using the crane while deploying the RHIB can only happen if no personnel are onboard. Ultimately, this increases the time it takes for a RHIB to be deployed due to the crew members boarding it once it is placed in the water. This poses a safety issue to a LEDET on board. In addition, the stern crane is not authorized for operations in sea states greater than 2.

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258 U.S. Navy.

259 U.S. Navy.

260 Department of the Navy, *Projected Operational Environmental and Required Operational Capabilities for Navy Expeditionary Logistics Support Group*, OPNAV Instruction 3501.101F (Washington, DC: Department of the Navy, 2018), 3.

However, when looking at the D&M aspect of counterdrug operations, the EPF serves as a suitable platform when working with another platform. The SPS 17 exercise with USNS Spearhead showed that the EPF is not effective when employed as a stand-alone D&M platform. While a Puma UAS successfully acquired suspected vessels, engine failure for the Puma during a D&M exercise in SPS 17 significantly reduced D&M capabilities for JIATF-S.[261] Scan Eagle data utilized on the EPF is limited, but information regarding its use on a USCG platform reinforces the effectiveness of a UAS onboard. During a deployment with the USCG *Bertholf*, Coast Guard personnel operated a Scan Eagle, which aided in the successful interdiction of 600 kg of cocaine.[262] Bertholf's crew used the ScanEagle to acquire real-time surveillance and position data on a suspected go-fast vessel. The UAS tracked down the target vessel and kept a continual eye on it until the MH-65D helicopter and RHIB came to intercept and detain the go-fast vessel crew.[263] Table 8 depicts the overall capabilities and deficiencies of the EPF-variant.

Table 8. EPF and Interdiction Factors

Factor	**EPF**
Speed	+
Aviation (Rotary)	—
Aviation (UAS)	+
RHIB	—
LEDET	+
HITRON	—

261 U.S. Navy, "Navy Lessons Learned Information System."

262 Stephanie Young, "UAS Deployment Nets Historic Drug Interdiction," *Coast Guard Compass*, July 24, 2013, https://coastguard.dodlive.mil/2013/07/uas-deployment-nets-historic-drug-interdiction/.

263 Young.

All in all, EPF capabilities do not make it an effective drug interdiction platform, but the EPF shows promise as a support platform for D&M. Although the EPF has a similar speed capability to the LCS, the aviation (rotary), RHIB, and HITRON deficiencies drastically reduce its effectiveness as an interdiction platform. However, with UAS onboard, such as the Puma and Scan Eagle, the EPF can be best utilized as an additional D&M platform while operating with an LCS.

V. CONCLUSION

DTOs continue to endanger American lives and threaten U.S. national security in the Western Hemisphere. Their activities endanger regional stability and political legitimacy. Thousands of lives have been lost and billions of dollars have been spent in defeating this threat. Even as our tactics, strategy, and policy have evolved over the past five decades, and as many successes in counterdrug interdiction as we and our partner nations have had, we still struggle to keep pace with DTOs' creative adaptability especially as regards the vessels they use to transit drugs into the United States. The Navy needs versatile, armed, high-speed interdiction ships capable of launching aircraft and sending Coast Guard boarding parties to intercept drug trafficking vessels as well as the capacity to immobilize potential drug boats from the air. This thesis examined policy, strategy, and the capabilities necessary to meet the counterdrug mission in the waters off Central and South America then weighed two platforms, the LCS and EPF, against those required capabilities. The thesis found the LCS to be a more complete interdiction platform, with one major drawback, while the EPF is only effective while working in tandem with a naval combatant platform. The conclusion summarizes main points, offers findings, and gives recommendations for policymakers' consideration as well as for further research.

What vessels are the DTOs using? The majority of illegal drugs in Central and South America are delivered to Mexico in single shipments through fishing trawlers. DTOs also use the go-fast platform, which provides a faster means to move narcotics over the open seas. Additionally, DTOs have developed multi-pronged techniques for maritime narcotics trafficking, rather than employing a fishing vessel for single cargos, like the narco torpedo method. Last but not least, DTOs have invested and will likely continue to invest in semi-submersible and fully submersible technology, with profit margins that make the production costs well worth it.

Why does the Navy need a new solution for interdiction platforms? The vessels typically used, such as the OHP Frigate and PC, have reached the end of their operational lives. To fill the resulting operational gap in the SOUTHCOM AOR, the Navy has employed the DDG. However, in an era of great power competition, deploying the DDG

for drug interdiction operations may not be the most effective use of a naval vessel needed elsewhere, such as in the waters near Iran, Russia, and China.

What are the concerns around using the LCS and EPF as reliable multi-purpose platforms appropriate for marine drug interdiction? Although both ship class have demonstrated success in the open ocean to detect, monitor, and interdict drug boats and submarines, concerns remain over their design, procurement, and survivability. Due to a design fault, previous EPF ships suffered bow damage on the high seas, making them vulnerable to wave smashes. Congress has constrained the Navy's LCS production capacity, and the inventory has been lowered to maintain an open competition for the new frigate. Finally, neither the LCS nor EPF is intended to be combat-capable; therefore, neither would fulfill the multi-purpose criterion. The EPF was built as a cargo ship with little armor or weaponry while the LCS is not expected to operate and survive in a combat environment.

A. FINDINGS

The thesis's analysis found that the LCS is more effective than the EPF in carrying out counterdrug operations in the waters off Central and South America. Both the Independence- and Freedom-variant LCS satisfy the requirements for a counterdrug mission's goal. Like the OHP Frigates, the LCS platforms can provide Combatant Commanders, particularly SOUTHCOM, necessary capabilities for maritime drug interdiction. The known Freedom-variant engineering flaw makes the Independence-variant a more capable platform for the various drug trafficking threats, but both LCS variants discussed here can conduct counterdrug operations.

However, and this is a large however, the Navy will be taking an operational risk if the Freedom-variant operates at high speeds while its combining gear issue remains unmodified. The combining gear failure onboard USS *Detroit* (LCS 7) and USS *Little Rock* (LCS 9) counterdrug operations led to their early retirement,[264] highlighting the importance of the speed capability in an interdiction platform. To avoid the flaw, the

[264] Larter, "US Navy Investigates Potential LCS Class-Wide Design Flaw."

Freedom-variant can operate only its diesel engines rather than the CODAG combination, but, by doing so, it can only reach speeds of 10 to 12 knots, significantly decreasing interdiction capabilities against the go-fast boat. Additionally, its speed limitations mean it will be slow to arrive at an operating area. The Freedom-variant can pursue the fishing and submersible threats, but it is out of luck against a go-fast boat and will be slow to respond to a drug trafficking event.

The EPF's capabilities are insufficient to make it a viable interdiction platform. It cannot embark an organic helicopter due to a lack of an onboard hangar, and, due to the stern crane situation, the use of a RHIB and LEDET is significantly restricted in sea states greater than two. As a result of the crew members boarding the RHIB after being placed in the water, deployment time may increase.

However, the EPF serves as a suitable platform for D&M when working with another platform. The SPS 17 exercise with the USNS Spearhead showed both the EPF's ineffectiveness as a stand-alone interdiction platform and also that using a ScanEagle UAS onboard successfully acquired information regarding suspected drug trafficking vessels. While Scan Eagle data use by EPFs is limited, information regarding its use on a Coast Guard platform reinforces the effectiveness of a UAS onboard in D&M. The ScanEagle UAS acquired real-time surveillance and position data on a suspected go-fast vessel. The UAS tracked down the target vessel and kept a continual eye on it until an aviation asset and RHIB intercepted and detained the go-fast crew. Table 9 lists the comparisons between the LCS and EPF.

Table 9. Comparison Results

Factor	Independence	Freedom	EPF
Speed	+	—	+
Aviation (Rotary)	+	+	—
Aviation (UAS)	+	+	+
RHIB	+	+	—
LEDET	+	+	—
HITRON	+	+	—

B. RESEARCH LIMITATIONS

The thesis's analysis was somewhat limited due to limited open-source information and also lack of employment of the EPF platform in the SOUTHCOM AOR. There have only been three instances where the class was utilized in the region, two of which involved counterdrug testing and the other as a tender for an LCS.

C. RECOMMENDATIONS

This thesis offers two recommendations for consideration:

1. Correct the engineering problems in the LCS Freedom-variants, and
2. Use the LCS as the lead ship for counterdrug operations with the EPF serving alongside as a D&M platform.

The LCS should launch and retrieve multiple unmanned aerial vehicles as well as helicopters. The LCS ability to remotely operate a UAV would expand the LCS sensor reach in the operational region, depending on the mission scope. By revealing contacts or targets at a distance from the LCS, this asset would improve the overall operational picture. This airborne capability would aid SOUTHCOM in managing asset location. For example, an LCS may remain in one area and patrol while the UAV is launched to patrol another location. As it receives intelligence, the LCS can speed to the operating area quickly. As more LCS platforms enter the fleet, this concept would provide a broader surveillance image of the functioning area while also reducing fuel use, allowing for a longer stay time.

Using the EPF as a support ship for the LCS would best leverage the capabilities from these two platforms to increase overall effectiveness. For example, the effectiveness of both a helicopter and UAS/UAV is substantially increased when two ships are air-capable. When one ship's helicopter is in the air, the second ship can function as a secondary "lily pad," allowing for an increase of an aircraft's operational range.

D. RECOMMENDATIONS FOR FURTHER RESEARCH

Further research is needed into the LCS concerning maintenance, engineering, and endurance. The problems of the LCS are a growing concern for both senior military and political officials, as discussed in Chapters I and III. In addition, the Navy recently

experimented with the concept of an EPF serving as an LCS tender, similar to the Emory S. Land tender class involving the USS *Gabrielle Giffords* (LCS 10) and USNS *Burlington* (EPF 10).[265] As more EPFs support SOUTHCOM, further research can be done to determine the viability of an EPF serving as a tender platform to support an LCS in the SOUTHCOM AOR and its effects in the Western Hemisphere.

E. CONCLUSION

To replace the OHP Frigates, the LCS was designed to be a multi-mission ship similar to the frigate, with the capacity to "plug-and-fight" multiple mission modules focusing on ASW, SUW, and MIW, as well as unmanned vehicles. Both the Independence and Freedom-variants have had significant engineering failures, resulting in millions of dollars in repair expenditures to return these ships to operation. Despite the program's failure, the LCS platforms have effectively executed the drug interdiction mission. The LCS in the SOUTHCOM AOR provides a capability and technology edge against DTOs in the open ocean. With the LCS's speed, maneuverability, and aviation support, the platform has no issues intercepting drug trafficking vessels in the Western Hemisphere. A proven, steady, and lethal combatant is essential for counterdrug operations. The LCS is the most established and reasonable choice for such operations. It is critical for the LCS to carry out counterdrug anti-narcotics operations in an era of great power competition.

The Navy needs to be creative in employing the LCS and EPF, based on the suitability and trade-offs presented in Chapters III and IV. The various DTOs across Central and South America will continue to traffic drugs worldwide when a drug is deemed illegal, as there will always be a profit to be made. Also, DTOs' sophistication and creativity in drug trafficking vessels have evolved and will likely continue to do so.

The Navy must continue to provide assets to the Western Hemisphere for the United States to have a substantial impact on drug trafficking in the maritime domain, focusing on the LCS and EPF platforms. As great power competition continues to grow worldwide,

[265] Megan Eckstein, "CO: USS Gabrielle Giffords Deployment Showcased LCS's Flexibility, Naval Strike Missile." *USNI News*, March 2, 2021. https://news.usni.org/2021/03/02/co-uss-gabrielle-giffords-deployment-showcased-lcss-flexibility-naval-strike-missile.

other naval assets such as cruisers or destroyers, which are often tasked in drug interdiction, are needed for primary missions in the waters near Russia, China, and Iran. The capability of the LCS and EPF platforms in integrated operations to support the requirements for counterdrug operations expands the options of military commanders. The LCS and EPF platforms will likely become the most prominent and ubiquitous emblems of the United States as more of these platforms enter the fleet and integrate into the Navy's array of global missions.

LIST OF REFERENCES

AeroVironment. “Puma AE RQ-20A.” Accessed May 27, 2021. https://www.avinc.com/images/uploads/product_docs/PumaAE_Datasheet_Web_v1.2.pdf.

Associated Press. “Drugs Sub Captured in South American Jungle.” *NBC News*, July 4, 2010. https://www.nbcnews.com/id/wbna38083616.

Austal. “Benchijigua Express.” January 9, 2015. https://www.austal.com/ships/benchijigua-express.

———. “Expeditionary Fast Transport (EPF).” October 20, 2015. https://usa.austal.com/ships/expeditionary-fast-transport-epf.

———. “Littoral Combat Ship (LCS).” November 25, 2014. https://www.austal.com/ships/littoral-combat-ship-lcs.

Burgess, Richard R. “Navy Orders 15th Expeditionary Fast Transport from Austal.” *Seapower*, March 1, 2021. https://seapowermagazine.org/navy-orders-15th-expeditionary-fast-transport-from-austal/.

Byrne, Bradley. “Byrne Advocates for Alabama Shipbuilders During Committee Hearing.” March 15, 2016. Video, 10:18. https://www.youtube.com/watch?v=qnJ8W8oTMaU.

Cannady, Brittney. “USNS Spearhead Conducts Narcotics Detection, Monitoring as Part of SPS 17.” *Military News*, August 18, 2017. https://www.militarynews.com/norfolk-navy-flagship/news/top_stories/usns-spearhead-conducts-narcotics-detection-monitoring-as-part-of-sps-17/article_c548d0ce-0bd8-5d2f-83d0-21b759313641.html.

Carlson, Stephen. “LCS Anti-Sub Package Finishes Round of Testing, Navy Says.” *Defense News*, December 5, 2018. https://www.upi.com/Defense-News/2018/12/05/LCS-anti-sub-package-finishes-round-of-testing-Navy-says/9861544027621/.

Cavas, Christopher P. “Pentagon Cuts LCS to 40 Ships, 1 Shipbuilder.” *Defense News*, December 6, 2015. https://www.defensenews.com/naval/2015/12/17/pentagon-cuts-lcs-to-40-ships-1-shipbuilder/.

Chalk, Peter. *Latin American Drug Trade: Scope, Dimensions, Impact, and Response*. RAND, 2011. https://www.rand.org/content/dam/rand/pubs/monographs/2011/RAND_MG1076.pdf.

Chaveriat, Peter. "Counter-Narcoterrorism Operations in the Eastern Pacific and Caribbean Operations Areas from 1970 through 1990." Master's thesis, U.S. Army Command and General Staff College, 2010. https://apps.dtic.mil/dtic/tr/fulltext/u2/a524429.pdf.

Clark, Vern. "Sea Power 21: Projecting Decisive Joint Capabilities." *U.S. Naval Institute*, October 1, 2002. https://www.usni.org/magazines/proceedings/2002/october/sea-power-21-projecting-decisive-joint-capabilities.

Cox, Katie. "USNS Spearhead Scan Eagle Launch." *U.S. Navy Public Affairs Support Element East*, July 19, 2018. https://www.dvidshub.net/image/4576753/usns-spearhead-scan-eagle-launch.

Department of Defense. *FY16 Navy Programs: Littoral Combat Ship (LCS).* Washington, DC: Department of Defense, 2016. https://www.dote.osd.mil/Portals/97/pub/reports/FY2016/navy/2016lcs.pdf?ver=2019-08-22-105304-133.

———. Projected Operational Environmental and Required Operational Capabilities for Navy Expeditionary Logistics Support Group. OPNAV Instruction 3501.101F. Washington, DC: Department of Defense, 2018.

———. *U.S. Cooperative Strategy for 21st Century Seapower 2015 Revision*. Washington, DC: Department of Defense, 2015. https://news.usni.org/2015/03/13/document-u-s-cooperative-strategy-for-21st-century-seapower-2015-revision.

Department of Homeland Security. *Counter Drug Operations*. Washington, DC: Department of Homeland Security, 2020. https://www.dhs.gov/sites/default/files/publications/uscg_-_counter-drug_operations.pdf.

———. *United States Coast Guard: Western Hemisphere Strategy*. Washington, DC: Department of Homeland Security, 2014. https://www.mycg.uscg.mil/Portals/6/Documents/PDF/CG_West_Hemisphere_Strategy.pdf?ver=2016-10-13-123053-130.

Department of the Navy. *From the Sea - Preparing the Naval Service for the 21st Century.* Washington, DC: Department of the Navy, 1992. https://www.hsdl.org/?view&did=484786.

Dodaro, Gene. *Defense Acquisitions Annual Assessment- Drive to Deliver Capabilities Faster Increases Importance of Program Knowledge and Consistent Data for Oversight*. GAO-20-439. Washington, DC: Government Accountability Office, 2020.

Drug Policy Alliance. "A Brief History of the Drug War." Accessed August 10, 2021. https://drugpolicy.org/issues/brief-history-drug-war.

———. “Drug War Statistics.” Accessed August 10, 2021. https://drugpolicy.org/issues/drug-war-statistics.

Eckstein, Megan. “CO: USS Gabrielle Giffords Deployment Showcased LCS’s Flexibility, Naval Strike Missile.” *USNI News*, March 2, 2021. https://news.usni.org/2021/03/02/co-uss-gabrielle-giffords-deployment-showcased-lcss-flexibility-naval-strike-missile.

———. “Navy Establishes LCS Review Team To Look At Manning, Operations As Fleet Grows.” *USNI News*, March 3, 2016. https://news.usni.org/2016/03/02/navy-establishes-lcs-review-team-to-look-at-manning-operations-as-fleet-grows.

———. “Navy Renames Three Ship Classes, Creates ‘Expeditionary’ Designator in Naming System.” *USNI News*, September 4, 2015. https://news.usni.org/2015/09/04/navy-renames-three-ship-classes-creates-expeditionary-designator-in-naming-system.

Eckstein, Megan, and Mallory Shelbourne. “Naval Surface Forces Kicks Off Follow-On LCS Study To Refine Maintenance, Reliability Issues.” *USNI News*, October 5, 2020. https://news.usni.org/2020/10/05/naval-surface-forces-kicks-off-follow-on-lcs-study-to-refine-maintenance-reliability-issues.

Edwards, Andrew. “LCS and the Future of CNT Operations in 4th Fleet.” Final, United States Naval War College, 2020. https://apps.dtic.mil/sti/pdfs/AD1105271.pdf.

Fincantieri. “Littoral Combat Ship - Freedom Class Frigates.” Accessed March 29, 2021. https://www.fincantieri.com/en/products-and-services/naval-vessels/lcs/.

Furlong, Jason. “Hunting Submarines From The Air.” *Physics World*, June 13, 2018. https://physicsworld.com/a/hunting-submarines-from-the-air/.

Gangcuangco, Peterjohn, Theodore Awa, and Kendrick Garrett. “Littoral Combat Ship And Expeditionary Fast Transport: Their Utility As Support Platforms During Humanitarian Aid / Disaster Relief Operations.” Master’s thesis, Naval Postgraduate School, 2020. https://calhoun.nps.edu/bitstream/handle/10945/66642/20Dec_Gangcuangco_Awa_Garrett.pdf?sequence=1&isAllowed=y.

Garg, Arjit. “A Look at Sikorsky MH-60R ‘Romeo’ Seahawk Helicopter That Can Hunt Submarines,” *News18,* February 26, 2020. https://www.news18.com/news/auto/a-look-at-sikorsky-mh-60r-romeo-seahawk-helicopter-that-can-hunt-submarines-2515129.html.

General Electric. “The LM2500 Engine.” GE Aviation. Accessed March 28, 2021. https://www.geaviation.com/marine/engines/military/lm2500-engine.

Gilbert, C.J. “Maritime SOF: Patrol Coastal Ships, A Vital Asset to the Theater CINC.” Master’s thesis, Marine Corps War College, 1999. https://apps.dtic.mil/dtic/tr/fulltext/u2/a529635.pdf.

Gilday, Michael. “Fiscal Year 2021 Projected Ship Inactivation Schedule.” United States Navy, June 20, 2021. https://www.navy.mil/Resources/NAVADMINs/Message/Article/2277297/fiscal-year-2021-projected-ship-inactivation-schedule/.

Gilmore, Michael. “Document: Joint High Speed Vessel Follow-on Operational Test and Evaluation Report.” *USNI News*, October 16, 2015. https://news.usni.org/2015/10/16/document-joint-high-speed-vessel-follow-on-operational-test-and-evaluation-report.

Goure, Daniel. *Modularity, the Littoral Combat Ship and the Future of the United States Navy.* Lexington Institute, November 2006. https://lexingtoninstitute.org/wp-content/uploads/modularity_nsf.pdf.

Handley, Edmund. “US Navy Littoral Combat Ship LCS Capabilities, Risks, Possible Missions, and Modules to Support Future USMC Operating Concepts.” Master’s thesis, USMC Command and Staff College, 2010. https://apps.dtic.mil/sti/pdfs/ADA600682.pdf.

Hein, Robert. “Maintenance, Modernization & Modules.” *U.S. Naval Institute*, July 24, 2015. https://www.usni.org/magazines/proceedings/2015/july/maintenance-modernization-modules.

Hendrix, Henry. “Influence Squadrons Are Here, But Will We Use Them?” *U.S. Naval Institute*, May 1, 2014. https://www.usni.org/magazines/proceedings/2014/may/influence-squadrons-are-here-will-we-use-them.

Hocke, Ken. “Austal USA Completes Sea Trials for Navy Fast Transport Vessel.” *Workboat*, August 4, 2020. https://www.workboat.com/shipbuilding/austal-usas-expeditionary-fast-transport-12-successfully-completes-sea-trials.

Holmes, Simon. “Colombian Army Seizes Electrical Drug Narco-Submarine.” *Daily Mail*, July 28, 2017. https://www.dailymail.co.uk/news/article-4739460/Colombian-army-seizes-electrical-drug-narco-submarine.html.

Hull, James, and Michael Emerson. “High ‘Seize’ Maritime Interdiction Works!” *United States Naval Institute Proceedings*, January 1, 1990. https://search-proquest-com.libproxy.nps.edu/docview/205995325/fulltext/48C9D557F0C64CC7PQ/1?accountid=12702.

Ingram, Cameron, and Matthew Arndt. “Patrol Craft Employment In The Caribbean.” *Surface Warfare Magazine*, November 12, 2020. https://www.public.navy.mil/surfor/swmag/Pages/Patrol-craft-employment-in-the-Caribbean.aspx.

Insitu. “Scan Eagle.” Accessed May 23, 2021. https://www.insitu.com/products/scaneagle.

Interpol. “Drug Trafficking and Terrorism Focus of INTERPOL European Regional Conference,” May 29, 2019. https://www.interpol.int/en/News-and-Events/News/2019/Drug-trafficking-and-terrorism-focus-of-INTERPOL-European-Regional-Conference.

———. “On Global Anti-Drug Trafficking Day INTERPOL and WCO Highlight the Pandemic’s Multiplying Effect on Illicit Activities,” June 26, 2020. https://www.interpol.int/en/News-and-Events/News/2020/On-global-anti-drug-trafficking-day-INTERPOL-and-WCO-highlight-the-pandemic-s-multiplying-effect-on-illicit-activities.

Isacson, Adam. “Restarting Aerial Fumigation of Colombia Drug Crops Is a Mistake.” WOLA. Last modified March 7, 2019. https://www.wola.org/analysis/restarting-aerial-fumigation-of-drug-crops-in-colombia-is-a-mistake/.

Jean, Grace. “Aluminum ‘Truck’ Joint High Speed Vessel: Great Potential, But Questions Remain.” *National Defense* 95, no. 688 (March 2011): 34–36. https://search-proquest-com.libproxy.nps.edu/docview/858093550/fulltext/45964D216B354A79PQ/1?accountid=12702.

Joint Chiefs of Staff. *Counterdrug Operations.* JP3-07.4. Washington, DC: Joint Chiefs of Staff, 2019. https://fas.org/irp/doddir/dod/jp3-07-4.pdf.

Jones, Nathan. “Pangas, Trickery, Intimidation, and Drug Trafficking in California.” *Small Wars Journal*, December 15, 2016. https://smallwarsjournal.com/jrnl/art/pangas-trickery-intimidation-and-drug-trafficking-in-california.

Krieg, Kenneth. “Joint High Speed Vessel (JHSV) Program Technology Development Strategy.” Official memorandum. Washington, DC: Department of Defense, 2006. https://myclass.dau.edu/bbcswebdav/institution/Courses/Deployed/TST/TST204%20and%20TST204V/Archives/March%2017%20Student%20Files/Student%20CD/1%20References/11%20Sample%20Documents%20%26%20Templates/TDS%20JHSV.pdf#:~:text=Joint%20High%20Speed%20Vessel%20(JHSV)%20will%20provide%20combatant%20commanders%20high,operate%20in%20austere%20port%20environments.

LaGrone, Sam. “Destroyers Continue to Prowl 4th Fleet As Coast Guard, Navy Rack Up $1B in Drug Seizures.” *USNI News*, July 2, 2020. https://news.usni.org/2020/07/02/destroyers-continue-to-prowl-4th-fleet-as-coast-guard-navy-rack-up-1b-in-drug-seizures.

———. “Last Oliver Hazard Perry Frigate USS Simpson Leaves Service, Marked for Foreign Sale.” *USNI News*, September 29, 2015. https://news.usni.org/2015/09/29/last-oliver-hazard-perry-frigate-uss-simpson-leaves-service-marked-for-foreign-sale.

———. “Littoral Combat Ship USS Milwaukee Repairs Could Last Weeks.” *USNI News*, December 15, 2015. https://news.usni.org/2015/12/14/littoral-combat-ship-uss-milwaukee-repairs-could-last-weeks.

———. “Low Cost Ship Options for U.S. Navy’s Drug War.” *USNI News*, March 20, 2013. https://news.usni.org/2013/03/20/low-cost-ship-options-for-u-s-navys-drug-war.

———. “Navy Calls Freedom LCS Propulsion Problem Class-Wide Defect, Won’t Take New Ships Until Fixed.” *USNI News*, January 19, 2021. https://news.usni.org/2021/01/19/navy-calls-freedom-lcs-propulsion-problem-class-wide-defect-wont-take-new-ships-until-fixed.

———. “Navy Won’t Reactivate Perry Frigates for SOUTHCOM Mission.” *USNI News*, December 11, 2017. https://news.usni.org/2017/12/11/secnav-memo-navy-wont-reactivate-perry-frigates-southcom-mission-will-send-ships-fight-drug-war-2018.

———. “SOUTHCOM Faller Lauds LCS USS Detroit Deployment, Asks For More Ships.” *USNI News*, January 30, 2020. https://news.usni.org/2020/01/30/southcom-faller-lauds-lcs-uss-detroit-deployment-asks-for-more-ships.

Larter, David. “US Navy Investigates Potential LCS Class-Wide Design Flaw.” *Defense News*, December 16, 2020. https://www.defensenews.com/naval/2020/12/15/the-us-navy-is-investigating-a-potential-lcs-class-wide-design-flaw/.

———. “US Navy Prepares Major Surge of Littoral Combat Ship Deployments.” *Defense News*, July 31, 2020. https://www.defensenews.com/naval/2020/07/31/the-us-navy-is-preparing-a-major-surge-of-lcs-deployments/.

Lee, Nathaniel. “America Has Spent over a Trillion Dollars Fighting the War on Drugs. 50 Years Later, Drug Use in the U.S. Is Climbing Again.” *CNBC*, June 17, 2021. https://www.cnbc.com/2021/06/17/the-us-has-spent-over-a-trillion-dollars-fighting-war-on-drugs.html.

Lohr, Tom. “Focus Littoral Combat Ships on Antisurface Warfare.” *U.S. Naval Institute*, February 2019. https://www.usni.org/magazines/proceedings/2019/february/focus-littoral-combat-ships-antisurface-warfare.

Loten-Beckford, Gary. “USNS Spearhead, SPS-JHSV 2015 Complete Fleet Experimentation Period Two.” *DVIDS*, July 23, 2015. https://www.dvidshub.net/news/173577/usns-spearhead-sps-jhsv-2015-complete-fleet-experimentation-period-two.

Lundquist, Edward. “Being in More Places at Once Calls for Both Large and Small Platforms: Expeditionary Fast Transport Can Provide Logistics Support at the End of the Supply Chain.” *Defense Transportation Journal* 75, no. 5 (2019): 20–25. http://www.jstor.org/stable/26927738.

Mabry, Donald. “The U.S. Military and the War on Drugs in Latin America.” *Journal of Interamerican Studies and World Affairs* 30, no. 2-3 (1988): 54–55. https://doi.org/10.2307/165979.

Marine Corps Forces South. “Task Force Marines Integrate With Navy, Provide Security Aboard USNS Burlington.” United States Marine Corps, October 2, 2020. https://www.marines.mil/News/News-Display/Article/2369913/task-force-marines-integrate-with-navy-provide-security-aboard-usns-burlington/.

Miller, Rich. “Bows of Navy’s Fast Transports Easily Damaged, Need Reinforcement.” *Professional Mariner*, April 29, 2016. https://www.professionalmariner.com/bows-of-navys-fast-transports-easily-damaged-need-reinforcement/.

Minsky, Dave. “Drug Smugglers Love This Janky Boat.” *VICE*, June 29, 2017. https://www.vice.com/en/article/43dypd/drug-smugglers-love-this-janky-boat.

Motherboard Staff. “Drug Smuggling With Submarines.” *VICE*, July 13, 2009. https://www.vice.com/en/article/aee3ma/drug-smuggling-with-submarines.

National Institute on Drug Abuse. “Is Drug Addiction Treatment Worth Its Cost?” Accessed August 10, 2021. https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/frequently-asked-questions/drug-addiction-treatment-worth-its-cost.

Naval Air Systems Command. “MH-60S Seahawk.” NAVAIR. Accessed March 28, 2021. https://www.navair.navy.mil/product/MH-60S-Seahawk.

———. “MQ-8B Fire Scout.” NAVAIR. Accessed March 28, 2021. https://www.navair.navy.mil/product/mq-8b.

Naval Drones. “Expeditionary Fast Transport (T-EPF) Unmanned Systems.” Accessed May 13, 2015. http://www.navaldrones.com/T-EPF.html.

Naval Today. “US Navy Receives Final Component of LCS ASW Mission Package,” *Naval Today,* December 6, 2018. https://www.navaltoday.com/2018/12/06/us-navy-receives-final-component-of-lcs-asw-mission-package/.

Office of National Drug Control Policy. *National Drug Control Strategy*. Washington, DC: White House, 2020. https://legislativeanalysis.org/wp-content/uploads/2020/02/2020-ONDCP-National-Drug-Control-Strategy.pdf.

O'Rourke, Ronald. *Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress*. CRS Report No. RL33741. Washington, DC: Congressional Research Service, 2019. https://fas.org/sgp/crs/weapons/RL33741.pdf.

Owen, Tess. "US Agents Watch as 'Narco Sub' Carrying $194 Million Worth of Cocaine Sinks After Bust." *VICE*, March 26, 2016. https://www.vice.com/en/article/43m7kd/us-agents-watch-as-narco-sub-carrying-194-million-worth-of-cocaine-sinks-after-bust.

Paris, Costas. "Global Shipping Faces Troubling New Smuggling Questions." *Wall Street Journal*, January 6, 2020. https://www.wsj.com/articles/global-shipping-faces-troubling-new-smuggling-questions-11578330634.

Powers, Robert Carney. "Birth of the Littoral Combat Ship." *U.S. Naval Institute Proceedings*, September 1, 2012. https://www.usni.org/magazines/proceedings/2012/september/birth-littoral-combat-ship.

Ramirez, Byron. "The Criminal and Terrorist Threat of Narco Submarine Technology." *Geopolitical Monitor*, June 7, 2016. https://www.geopoliticalmonitor.com/the-criminal-and-terrorist-threat-of-narco-submarine-technology/.

Ramirez, Byron, and Robert J. Bunker, eds. "Narco-Submarines: Specially Fabricated Vessels Used for Drug Smuggling Purposes." U.S. Army Foreign Military Studies, 2015. https://scholarship.claremont.edu/cgi/viewcontent.cgi?article=1029&context=cgu_facbooks.

Raven Industries Inc. "Photo Release - Raven Industries Persistent Surveillance Solution Supports U.S. Navy South Maritime Operations." Intrado GlobeNewswire, June 10, 2013. https://www.globenewswire.com/news-release/2013/06/10/553145/14798/en/Photo-Release-Raven-Industries-Persistent-Surveillance-Solution-Supports-U-S-Navy-South-Maritime-Operations.html.

Renfroe, Shannon. "USS Independence (LCS 2) Sails in the Eastern Pacific." *DVIDS*, February 27, 2019. http://www.dvidshub.net/image/5139970/uss-independence-lcs-2-sails-eastern-pacific.

Robbins, Seth. "Why Is U.S. Sending Navy Warships to Thwart Drug Smugglers?" *InSight Crime*, April 27, 2020. https://www.insightcrime.org/news/analysis/us-navy-warships-drug-smugglers/.

Roblin, Sebastien. "Here Is Why the U.S. Navy's Littoral Combat Ships Punch below Their Weight." *National Interest*, November 5, 2017. https://nationalinterest.org/blog/the-buzz/here-why-the-us-navys-littoral-combat-ships-punch-below-23042.

———. "The Navy Spent $30B and 16 Years to Fight Iran with A Littoral Combat Ship That Doesn't Work." *NBC News*, July 19, 2019. https://www.nbcnews.com/think/opinion/navy-spent-30b-16-years-fight-iran-littoral-combat-ship-ncna1031806.

Rolls-Royce. “New U.S. Navy Milestone for Rolls-Royce Gas Turbine.” *Defense Aerospace*, June 4, 2008. http://www.defense-aerospace.com/article-view/release/94875/lcs1-powers-up-main-gas-turbine-engines.html.

Rudko, David D. “Logistical Analysis of the Littoral Combat Ship.” Master’s thesis, Naval Postgraduate School, 2003. https://calhoun.nps.edu/bitstream/handle/10945/1069/03Mar_Rudko.pdf?sequence=1&isAllowed=y.

Seaforces. “Freedom Class LCS Littoral Combat Ship U.S. Navy.” Accessed March 28, 2021. https://www.seaforces.org/usnships/lcs/Freedom-class.htm.

———. “Independence Class LCS Littoral Combat Ship U.S. Navy.” Accessed January 8, 2021. http://www.seaforces.org/usnships/lcs/Independence-class.htm.

Seck, Hope. “New Details Emerge on Littoral Combat Ship Breakdowns.” *Military News*, December 9, 2016. https://www.military.com/daily-news/2016/12/09/new-details-emerge-on-littoral-combat-ship-breakdowns.html.

Seelke, Clare, Liana Wyler, June Beittel, and Mark Sullivan. *Latin America and the Caribbean: Illicit Drug Trafficking and U.S. Counterdrug Programs*. CRS Report No. R41215. Washington, DC: Congressional Research Service, 2011. https://fas.org/sgp/crs/row/R41215.pdf.

Shalal-Esa, Andrea. “US Navy Request Raises Issue About Aluminum Ships.” *Reuters*, March 16, 2010. https://www.reuters.com/article/navy-aluminum-idUSN1513314120100316.

Sisk, Richard. “New Law Restricts the Navy to 35 Littoral Combat Ships.” *Military News*, December 23, 2019. https://www.military.com/daily-news/2019/12/23/new-law-restricts-navy-35-littoral-combat-ships.html.

Smith, Kaitlin. “Don’t Give Up on the Littoral Combat Ship.” Text. *The National Interest*, January 10, 2017. https://nationalinterest.org/blog/the-buzz/dont-give-the-littoral-combat-ship-19009.

Smithberger, Mandy, and Pierre Sprey. “The U.S. Navy’s Redesigned Future Ship Still Won’t Fight.” *Medium*, December 16, 2016. https://medium.com/war-is-boring/the-u-s-navys-redesigned-future-ship-still-won-t-fight-7b2e066b4705.

Straub, Dan. “Littoral Combat Ships for Maritime COIN.” *U.S. Naval Institute*, January 1, 2021. https://www.usni.org/magazines/proceedings/2021/january/littoral-combat-ships-maritime-coin.

Stryker, John. “Narcosubmarines: Nexus of Terrorism and Drug Trafficking?” Center for International Maritime Security, January 11, 2018. http://cimsec.org/narcosubmarines-nexus-terrorism-drug-trafficking/35223.

Sutton, H. I. “Completely New Type of Narco Submarine Discovered In The Atlantic.” *Forbes*, August 31, 2020. https://www.forbes.com/sites/hisutton/2020/08/31/completely-new-type-of-narco-submarine-discovered-in-the-atlantic/.

———. “Narco Submarines, Torpedoes and Semi-Submersibles.” Covert Shores Naval Warfare, June 24, 2010. http://covertshores.blogspot.com/2010/06/narco-submarines-torpedoes-and-semi.html.

———. “Rare Electric Narco Submarine Seized in Colombia.” *USNI News*, November 16, 2020. https://news.usni.org/2020/11/16/rare-electric-narco-submarine-seized-in-colombia.

———. “Why The Navy’s Latest Narco Submarine Seizure Is A Big Deal.” *Forbes*, June 12, 2020. https://www.forbes.com/sites/hisutton/2020/06/12/why-the-navys-latest-narco-submarine-seizure-is-important/.

Sykes, LaShawn. “USNS Burlington Carries out Proof-of-Concept Testing.” *DVIDS*, September 27, 2020. https://www.dvidshub.net/news/378778/usns-burlington-carries-out-proof-concept-testing.

Thiesen, William. “The Long Blue Line: HITRON – 20 Years of Hitting New Highs.” *Coast Guard Compass*, September 14, 2017. https://coastguard.dodlive.mil/2017/09/the-long-blue-line-hitron-20-years-of-hitting-new-highs/.

Thomas, Jennifer. “UX-24 Expands Fire Scout’s Operational Flexibility,” *Tester,* July 16, 2020. https://www.dcmilitary.com/tester/tenant_profile/ux-24-expands-fire-scout-s-operational-flexibility/article_3845a86b-1976-5c0f-90ff-a4b88cc6e90e.html.

Thorne, Stephen. “Capture of 22-Metre Transatlantic Narco-Sub Marks New Era in War on Drugs.” *Legion Magazine*, December 11, 2019. https://legionmagazine.com/en/2019/12/capture-of-22-metre-transatlantic-narco-sub-marks-new-era-in-war-on-drugs/.

Uhls, Daniel. “Does the Fast Patrol Boat Have a Future in the Navy?” Master’s Thesis, U.S. Army Command and General Staff College, 2002. https://apps.dtic.mil/dtic/tr/fulltext/u2/a415966.pdf.

United Nations. “Drug Trafficking.” United Nations: Office on Drugs and Crime, November 17, 2020. //www.unodc.org/unodc/en/drug-trafficking/index.html.

U.S. Department of Justice. *2019 Drug Enforcement Administration: National Drug Threat Assessment*. Washington, DC: U.S. Department of Justice, 2019. https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020_Low_Web-DIR-007-20_2019.pdf.

U.S. Navy. “11 Meter Naval Special Warfare Rigid Inflatable Boat (RIB).” Last modified January 9, 2017. https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2171633/11-meter-naval-special-warfare-rigid-inflatable-boat-rib/.

———. “LCS In Action Against An Armed Enemy.” Accessed November 8, 2020. https://www.public.navy.mil/surfor/lcs1/Pages/LCSInActionAgainstAnArmedEnemy.aspx.

———. “Littoral Combat Ship.” *All Hands Magazine*. Accessed March 29, 2021. https://allhands.navy.mil/Features/LCS/.

———. “Littoral Combat Ships - Anti-Submarine Warfare (ASW) Mission Package.” Last modified December 6, 2016. https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2167531/littoral-combat-ships-anti-submarine-warfare-asw-mission-package/.

———. “Littoral Combat Ship Class - LCS.” Last modified March 10, 2020. https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2171607/littoral-combat-ship-class-lcs/.

———. “Littoral Combat Ships - Surface Warfare Mission Package.” Last modified December 8, 2016. https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2220640/littoral-combat-ships-surface-warfare-mission-package/.

———. “MQ-8C Fire Scout.” Last modified February 21, 2019. https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2159302/mq-8c-fire-scout/.

———. Navy Lessons Learned Information System.” Accessed May 30, 2021, https://www.jllis.mil.

———. “Patrol Coastal Ships - PC.” Last modified January 9, 2017. https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2171625/patrol-coastal-ships-pc/.

———. “SURFPAC Littoral Combat Ships Page.” Accessed January 8, 2021. https://www.public.navy.mil/surfor/pages/LittoralCombatShips.aspx.

———.”USS FREEDOM (LCS 1) Littoral Combat Ship.” Naval Vessel Register, October 11, 2019. https://www.nvr.navy.mil/shipdetail/shipsdetail_LCS_1.html

U.S. Naval Forces Southern Command, U.S. Naval Forces Southern Command. “Ship’s Tethered Balloon Destroyed by Lightning.” *Defense Aerospace*, June 13, 2014. https://www.defense-aerospace.com/articles-view/release/3/154641/usnavso%C2%A7us-4th-fleet-statement-regarding-aerostat.html.

Vavasseur, Xavier. “Austal USA Delivers 12th Spearhead-Class Expeditionary Fast Transport (EPF) Ship to U.S. Navy.” *Naval News*, September 3, 2020. https://www.navalnews.com/naval-news/2020/09/austal-usa-delivers-12th-spearhead-class-expeditionary-fast-transport-epf-ship-to-u-s-navy/.

VICE. “Colombian Narcosubs.” October 26, 2011. Video, 27:41. https://www.youtube.com/watch?v=2Rp-C1ph_g8.

Wartsila. “USS Independence.” Accessed March 20, 2021. https://www.wartsila.com/usa/marine/reference.

Watkins, Lance J. “Self-Propelled Semi-Submersibles the next Great Threat to Regional Security and Stability.” Master’s thesis, Naval Postgraduate School, 2011. https://calhoun.nps.edu/bitstream/handle/10945/5629/11Jun_Watkins.pdf?sequence=1&isAllowed=y.

Watson, Brian. “Case Analysis of the Joint High-Speed Vessel Program: Defense Acquisition.” Master’s thesis, Naval Postgraduate School, 2016. https://apps.dtic.mil/sti/pdfs/AD1030116.pdf.

Wigell, Mikael, and Mauricio Romero. “Transatlantic Drug Trade: Europe, Latin America and the Need to Strengthen Anti-Narcotics Cooperation.” *The Finnish Institute of International Affairs*, June 2013. https://eulacfoundation.org/en/system/files/Transatlantic%20Drug%20Trade.pdf.

Willard Marine. “Sea Force 700.” Accessed March 25, 2021. http://www.willardmarine.com/images/brochures/SEAFORCE700.pdf.

Williams, Ford. “USNS CARSON CITY.” *DVIDS*, March 3, 2018. http://www.dvidshub.net/image/4189641/usns-carson-city.

Woody, Christopher. “US Navy Helicopters and Coast Guard Snipers Are Firing on Suspected Drug Traffickers.” *Yahoo News*, February 2, 2021. https://news.yahoo.com/us-navy-helicopters-coast-guard-222334040.html.

Yagoub, Mimi. “Why Colombia Traffickers Love High-Tech ‘Narco Torpedoes.” *InSight Crime*, October 25, 2016. https://www.insightcrime.org/news/analysis/why-colombia-cocaine-traffickers-love-high-tech-torpedoes/.

Young, Stephanie. “UAS Deployment Nets Historic Drug Interdiction.” *Coast Guard Compass*, July 24, 2013. https://coastguard.dodlive.mil/2013/07/uas-deployment-nets-historic-drug-interdiction/.

Zimmerman, Gregory M. “The U.S. Navy Littoral Combat Ship: Current Issues and How to Employ It in the Future.” Master’s thesis, USMC Command and Staff College, 2012. https://apps.dtic.mil/sti/pdfs/ADA601555.pdf.

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